Service
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Service Manual

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CLASS 1
LASER PRODUCT

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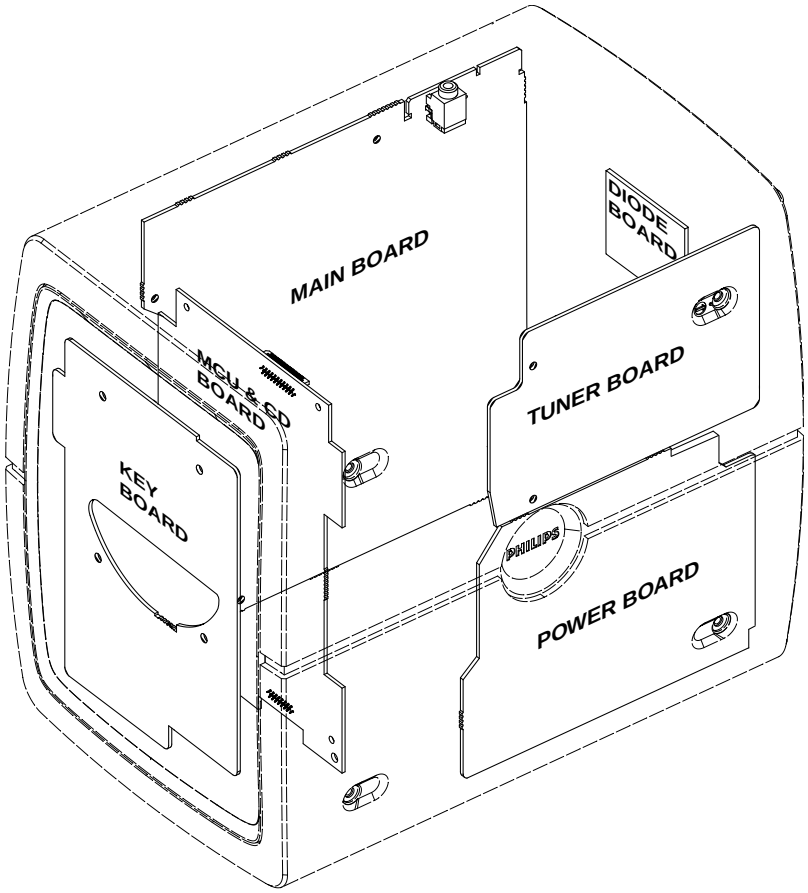
GB 3140 785 32550

Version 1.0

PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS



VERSION VARIATIONS

Type/Versions / Features & Board in used	MC-M350				
	/21	/22	/25		
RDS function		x	x		
ECO Standby		x	x		
Aux Input	x	x	x		
Digital Coaxial Out					
Line Out					
Subwoofer Out					
Headphone Out	x	x	x		
AC Voltage Selector	x				
Non-Cenelec Tuner	x				
Cenelec Tuner		x	x		

SPECIFICATIONS

GENERAL:

Mains voltage
- /21 : 120V / 230V ±15% Switchable
- /22/25 : 230V ±10%

Mains frequency
- /21 : 50/60Hz
- /22/25 : 50Hz

Power consumption
- /22/25 : < 1W at ECO Standby
- : < 9W at Standby (DEMO mode off)
- : 53W at Active

Clock accuracy : < 4 seconds per day
Dimension centre unit : 155 x 220 x 270mm

TUNER:

FM

Tuning range : 87.5-108MHz
IF frequency : 10.7MHz ± 20kHz
Aerial input : 75Ω Coaxial
Sensitivity at 26dB S/N : < 22dBf
Selectivity at S9/300kHz : > 33dB
IF Rejection : > 60dB
Image Rejection : > 20dB
Distortion at RF=1mV, dev. 75kHz : < 3%
-3dB Limiting point : < 23.5dB
Crosstalk at RF=1mV, dev. 40kHz : > 26dB
Modulation Hum : > 45dB
AM Suppression I/P: 48~82dBf : > 25dB

AM (MW)

Tuning range
- /21/22/25 : 531-1602kHz
- /21 : 530-1700kHz

Grid
- /21 : 9kHz / 10kHz
- /22/25 : 9kHz

IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial 18.1μH
Sensitivity at 26dB S/N : < 3.25mV/M
Selectivity at S9/300kHz : > 15dB
AGC Figure of Merit : > 25dB
IF rejection : > 24dB
Image rejection : > 20dB
Distortion at RF=50mV, m=80% : < 5%
Mudulation Hum with REC or : > 40dB
Spurious Response Rejection : > 28dB

LW (Only for /22/25)

Tuning range : 153-279kHz
Grid : 3kHz
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial 18.1μH
Maximum Sensitivity : < 1.5mV/M
Sensitivity at 26dB S/N : < 6.0mV/M
Selectivity at S9/300kHz : > 24dB
IF rejection : > 26dB
Image rejection : > 20dB
Distortion I/P:5~50mV : < 5%
Modulation Hum with REC on : > 40dB

AMPLIFIER:

Output power (6Ω, 1kHz, 10% THD) : 30W
Frequency response within -3dB : 60Hz-14kHz
Digital Sound Control (DSC) : Optimal,Classic,Jazz, Rock
DBB : ON/OFF
Incredible Surround (IS) : ON/OFF
Input sensitivity (±3dB) for Rated Output Power at 1kHz
- Aux in : 500mV; Rs=600Ω
- Tuner in : FM67.5kHz, AM80%Modulation
- CD in : -6dB track
- Tape in : 250nWb/m

Output sensitivity
- Headphone output at 32Ω : 15mW ± 2dB

CASSETTE RECORDER:

Number of track : 2 Tracks (Stereo)
Tape speed : 4.76 cm/sec ± 2%
Wow and flutter : < 0.4% DIN
Fast-wind/Rewind time C60 : 130 sec
Bias system : 78kHz ± 10kHz
Rec/Pb freq. response within 8dB : 80Hz - 10kHz
Signal to Noise Ratio (A-weighted) : ≥ 48dBA
Distortion 250nWb/m : < 5%
Channel Difference at overall : < 4dB

COMPACT DISC:

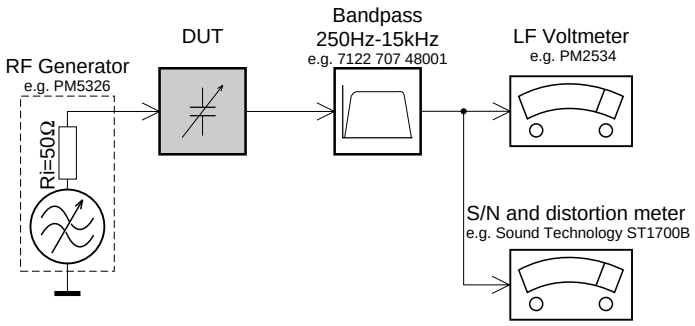
Frequency response within ± 3dB : 63Hz - 14kHz
Output level (in Vrms) : 500mV, Z_{out} = 100Ω
Signal/Noise ratio (A-weighted) : > 62dBA
Distortion at 1kHz : < 0.02%
Channel unbalance at 1kHz : ≤ 2dB
Channel separation at 1kHz : > 30dB
Emphasis : 15/50 μS (switched automatically)
THD Noise(1kHz) : 1.00%
Outband Attenuation : > 20dB for Freq. > 40kHz

MP3 - CD :

Bit rates : 32K - 320Kps
Sampling rates : 32KHz/44.1KHz/48KHz

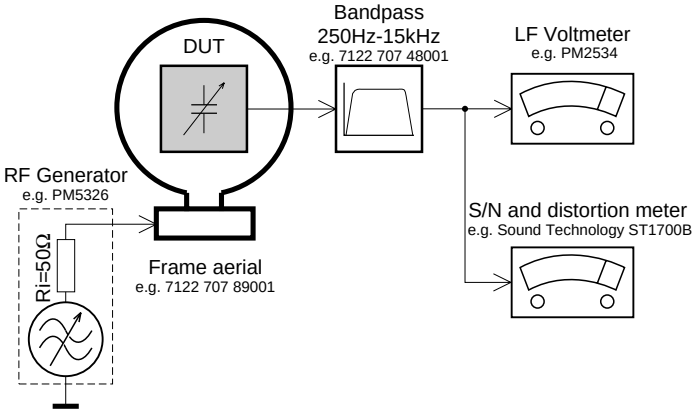
MEASUREMENT SETUP

Tuner FM



Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

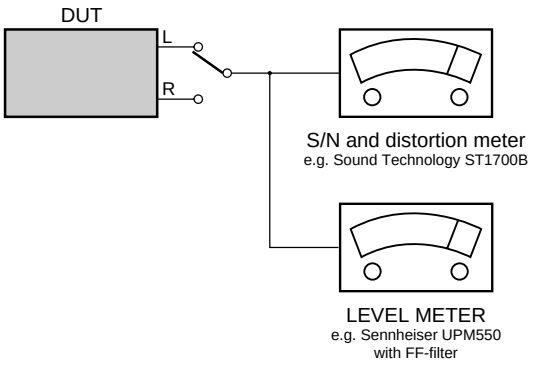
Tuner AM (MW,LW)



To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

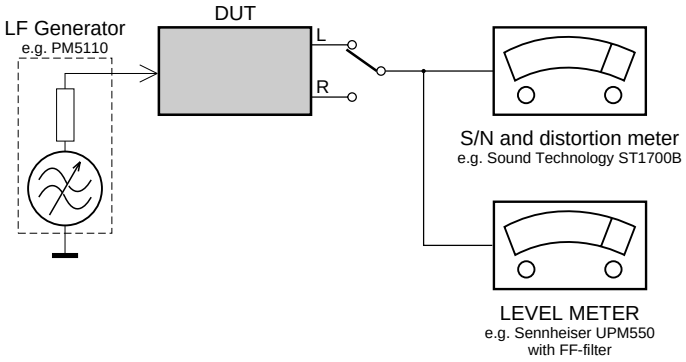
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)



Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071



SERVICE AIDS

Service Tools:

Universal Torx driver holder 4822 395 91019
Torx bit T10 150mm 4822 395 50456
Torx driver set T6 - T20 ..... 4822 395 50145
Torx driver T10 extended 4822 395 50423

Cassette:

SBC419 Test cassette CrO2 ..... 4822 397 30069
SBC420 Test cassette Fe 4822 397 30071
MTT150 Dolby level 200nWb/M 4822 397 30271

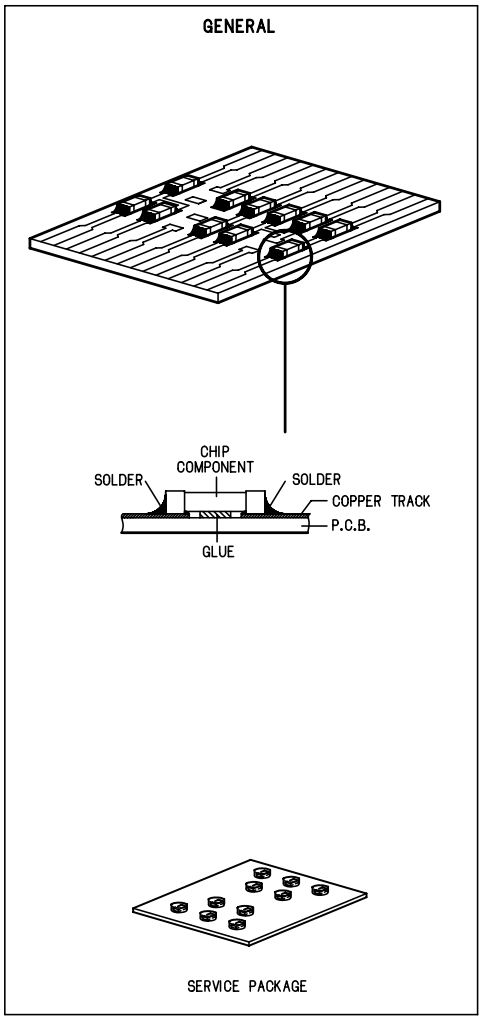
Compact Disc:

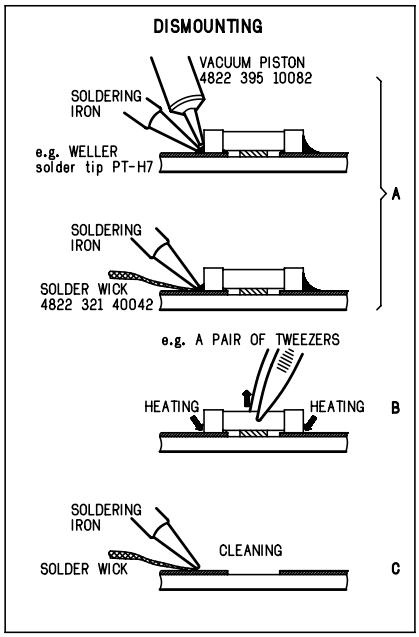
SBC426/426A Test disc 5 + 5A 4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz 4822 397 30155
SBC429 Audio Signals disc 4822 397 30184
Dolby Pro-logic Test Disc 4822 395 10216

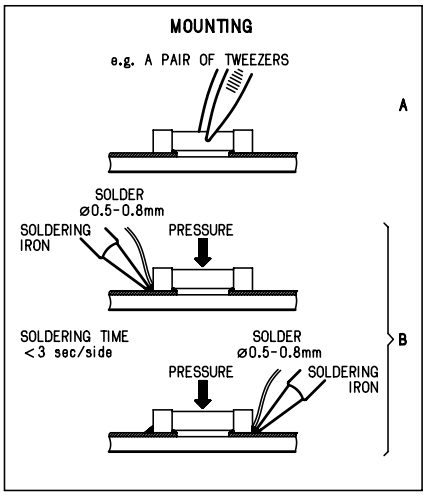
ESD Equipment:

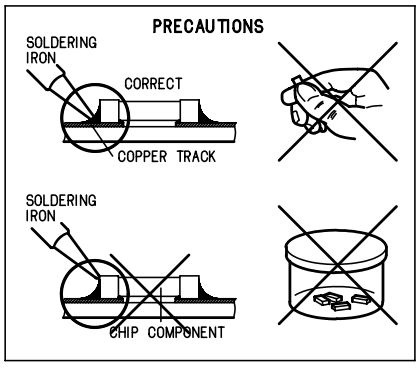
Anti-static table mat - large 1200x650x1.25mm ... 4822 466 10953
Anti-static table mat - small 600x650x1.25mm 4822 466 10958
Anti-static wristband 4822 395 10223
Connector box (1MΩ) 4822 320 11307
Extension cable
(to connect wristband to conn. box) 4822 320 11305
Connecting cable
(to connect table mat to conn. box) 4822 320 11306
Earth cable (to connect product to mat or box) 4822 320 11308
Complete kit ESD3
(combining all above products) 4822 320 10671
Wristband tester 4822 344 13999

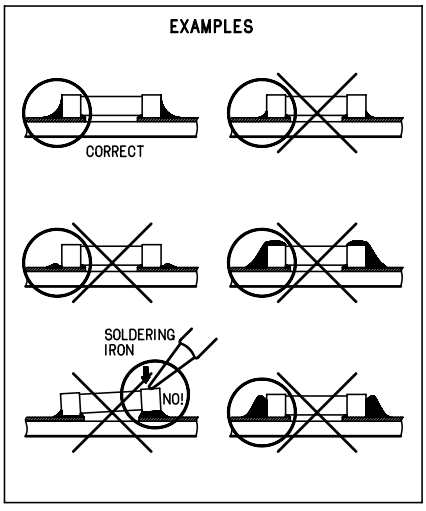
HANDLING CHIP COMPONENTS











ESD

GB WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

F ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

D WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

NL WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

NL

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

F

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utiliséés les piéces de rechange identiques à celles spécifiées.

D

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

I

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

GB Warning !

Invisible laser radiation when open.
Avoid direct exposure to beam.

S Varning !

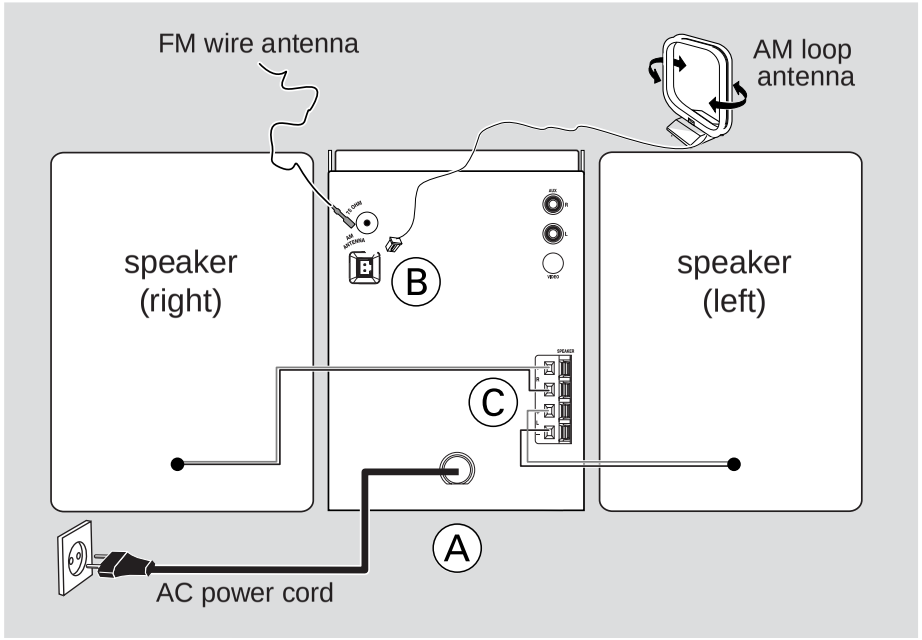
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

SF Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

DK Advarse !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.



Rear connections

The type plate is located at the rear of the system.

Ⓐ **Power**

Before connecting the AC power cord to the wall outlet, ensure that all other connections have been made.

WARNING!

– For optimal performance, use only the original power cable.

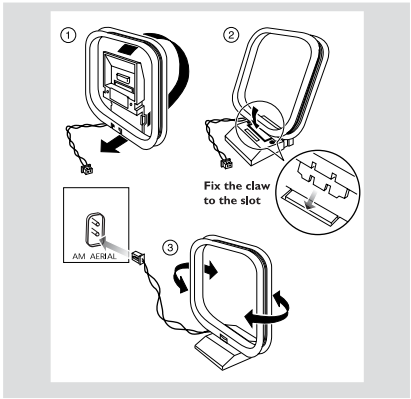
– Never make or change any connections with the power switched on.

To avoid overheating of the system, a safety circuit has been built in. Therefore, your system may switch to Standby mode automatically under extreme conditions. If this happens, let the system cool down before reusing it *(not available for all versions)*.

Ⓑ **Antennas Connection**

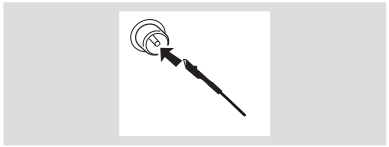
Connect the supplied AM loop antenna and FM antenna to the respective terminals. Adjust the position of the antenna for optimal reception.

AM Antenna



Position the antenna as far as possible from a TV, VCR or other radiation source.

FM Antenna

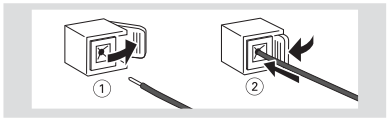


For better FM stereo reception, connect an outdoor FM antenna to the FM AERIAL (FM ANTENNA) terminal.

Ⓒ **Speakers Connection**

Front Speakers

Connect the speaker wires to the SPEAKERS terminals, right speaker to "RIGHT" and left speaker to "LEFT", colored (marked) wire to "+" and black (unmarked) wire to "−".



Fully insert the stripped portion of the speaker wire into the terminal as shown.

Notes:

– For optimal sound performance, use the supplied speakers.

– Do not connect more than one speaker to any one pair of + / − speaker terminals.

– Do not connect speakers with an impedance lower than the speakers supplied. Please refer to the SPECIFICATIONS section of this manual.

Optional connection

The optional equipment and connecting cords are not supplied. Refer to the operating instructions of the connected equipment for details.

Connecting other equipment to your system

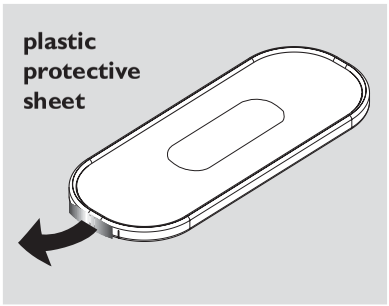
Connect the audio left and right OUT terminals of a TV, VCR, Laser Disc player, DVD player or CD Recorder to the **AUX** terminals.

Note:

– If you are connecting equipment with a mono output (a single audio out terminal), connect it to the AUX left terminal. Alternatively, you can use a "single to double" cinch cable (the output sound still remain mono).

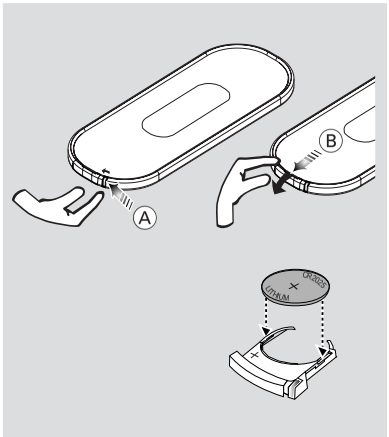
Before using the remote control

1. Pull out the plastic protective sheet.
2. Select the source you wish to control by pressing one of the source select keys on the remote control (for example CD, TUNER).
3. Then select the desired function (for example ▶II, I◀◀, ▶▶I).



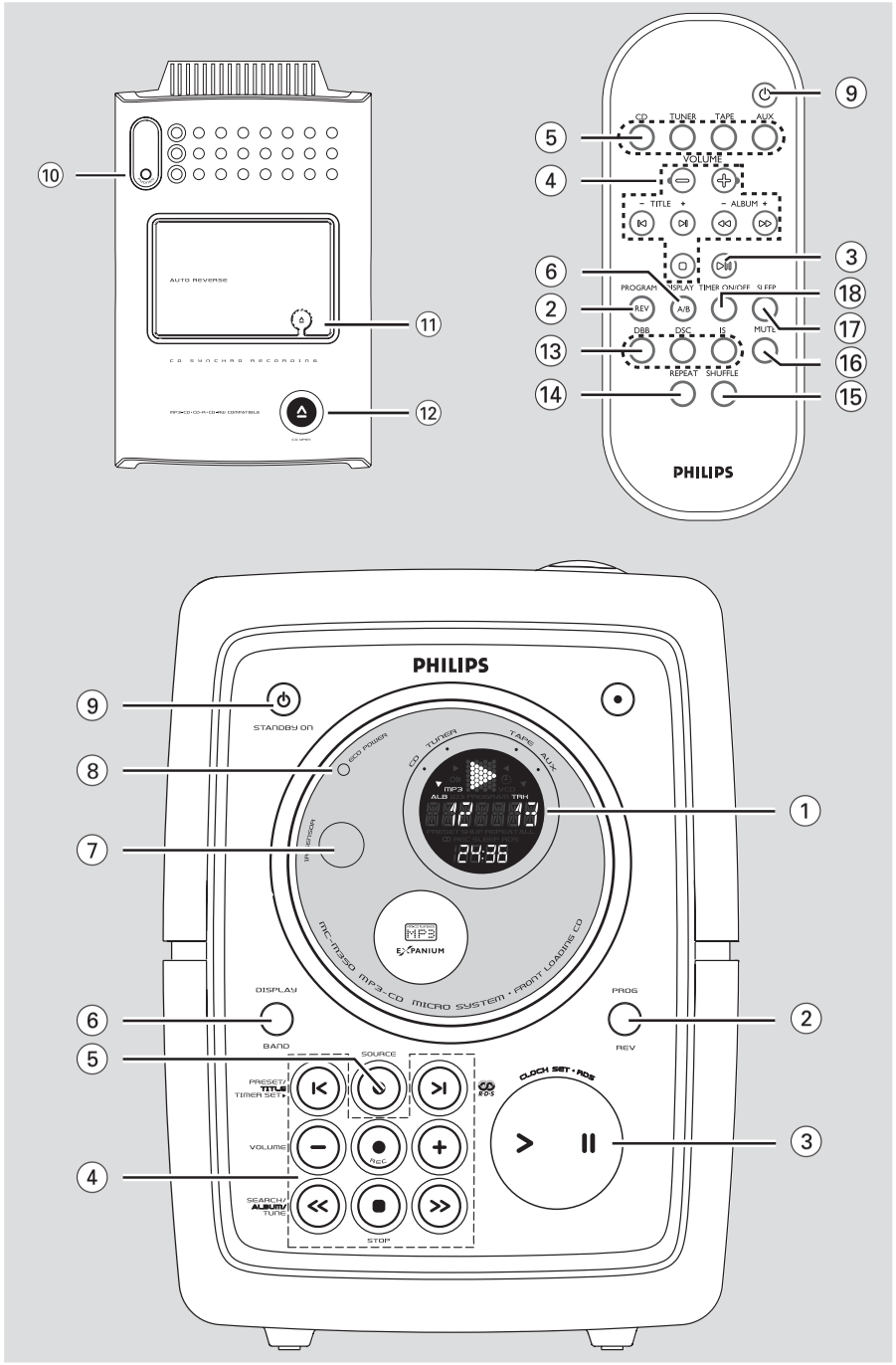
Replacing battery (lithium CR2025) into the remote control

1. Pull out the knob Ⓐ slightly to the left.
2. Pull out the battery compartment Ⓑ .
3. Replace a new battery and fully insert the battery compartment back to the original position.



CAUTION!

Batteries contain chemical substances, so they should be disposed off properly.



Controls

Controls on the system and remote control

① **Display**
– shows the status of the system.

② **PROG/ REV**
for CD/MP3-CD ..... programmes tracks and reviews the programme.
for TUNER ..... programmes tuner stations manually or automatically.
for TAPE ..... sets tape reverse modes

③ **CLOCK SET • RDS / > II**
for CLOCK ..... set the clock function.
for CD/MP3-CD ..... starts or interrupts CD playback
for TAPE ..... starts the tape playback
for TUNER ..... displays RDS information

④ **Mode Selection**
VOLUME (– / +)
– adjusts the volume level.
– *on the system only* - adjusts the hour and minutes for the clock/ timer functions.
PRESET/ TITLE/ TIMER SET I< / >I (on the remote control |◀ / ▶|)
for TUNER ..... selects a preset radio station.
for CD ..... skips to the beginning of a current track/previous/ later track
for MP3-CD ..... to select previous/ next title
for Timer (**I<** only) to set timer under standby
SEARCH/ ALBUM/ TUNE << / >> (on the remote control ◀◀ / ▶▶)
for TUNER ..... Tune to a station
for CD ..... to search backward or forward.
for MP3-CD ..... select previous/ next album.
for TAPE ..... fast rewind/ wind tape
STOP ■
..... stops CD/ MP3-CD playback or erase a CD programme.
..... stops tape playback/ recording.
REC ..... starts recording.

⑤ **SOURCE**
– selects the respective sound source for CD/ TUNER/ TAPE /AUX.
– switches on the system.

⑥ **DISPLAY-BAND** (on the remote control **DISPLAY A/B**)
for TUNER ..... change the tuner radio band.(FM/ MW/ LW)
for CD/MP3-CD ..... change the CD display mode
for TAPE ..... switches tape direction

⑦ **iR SENSOR**
– infrared sensor for remote control.

⑧ **ECO POWER indicator**

⑨ **STANDBY ON ⏻**
– switches the system to standby.

⑩ **PHONES** – connects to headphone.

⑪ **⏏** - open/ close the cassette door.

⑫ **CD OPEN ⏏**
– open the CD door.

⑬ **INTERACTIVE SOUND controls:**
DBB ..... (Dynamic Bass Boost) enhances the bass.
DSC ..... (Digital Sound Control) selects sound characteristics: CLASSIC/ JAZZ/ ROCK/ OPTIMAL.
INCREDIBLE SURR. (IS) ..... creates a super-enhanced stereo effect.

⑭ **REPEAT**
– repeats a track/ CD programme/ entire CD.

⑮ **SHUFFLE**
– plays CD tracks in random order.

⑯ **MUTE**
– interrupts and resumes sound reproduction.

⑰ **SLEEP**
– activates/deactivates or selects the sleeper time.

⑱ **TIMER ON / OFF**
– activates/deactivates the timer function.

Notes for remote control:
– First select the source you wish to control by pressing one of the source select keys on the remote control (for example CD, TUNER).
– Then select the desired function (for example > II , I< , >I).

Important notes for users in the U.K.

Mains plug
This apparatus is fitted with an approved 13 Amp plug. To change a fuse in this type of plug proceed as follows:

1. Remove fuse cover and fuse.
2. Fix new fuse which should be a BS1362 5 Amp, A.S.T.A. or BSI approved type.
3. Refit the fuse cover.

If the fitted plug is not suitable for your socket outlets, it should be cut off and an appropriate plug fitted in its place.
If the mains plug contains a fuse, this should have a value of 5 Amp. If a plug without a fuse is used, the fuse at the distribution board should not be greater than 5 Amp.

Note: The severed plug must be disposed of to avoid a possible shock hazard should it be inserted into a 13 Amp socket elsewhere.

How to connect a plug
The wires in the mains lead are coloured with the following code: blue = neutral (N), brown = live (L).

- As these colours may not correspond with the colour markings identifying the terminals in your plug, proceed as follows:
  – Connect the blue wire to the terminal marked N or coloured black.
  – Connect the brown wire to the terminal marked L or coloured red.
  – Do not connect either wire to the earth terminal in the plug, marked E (or ⏚) or coloured green (or green and yellow).

Before replacing the plug cover, make certain that the cord grip is clamped over the sheath of the lead - not simply over the two wires.

Copyright in the U.K.
Recording and playback of material may require consent. See Copyright Act 1956 and The Performer's Protection Acts 1958 to 1972.

Italia

DICHIARAZIONE DI CONFORMITA'

Si dichiara che l'apparecchio MC-M350 Philips risponde alle prescrizioni dell'art. 2 comma 1 del D.M. 28 Agosto 1995 n. 548.

Fatto a Eindhoven

Philips Consumer Electronics
Philips, Glaslaan 2
5616 JB Eindhoven, The Netherlands

Norge

Typeskilt finnes på apparatens underside.

Observer: Nettbryteren er sekundert innkoplet. Den innebygde netdelen er derfor ikke frakoplet nettet så lenge apparatet er tilsluttet nettkontakten.

For å redusere faren for brann eller elektrisk støt, skal apparatet ikke utsettes for regn eller fuktighet.

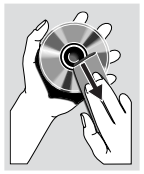
CAUTION

Use of controls or adjustments or performance of procedures other than herein may result in hazardous radiation exposure or other unsafe operation.

Maintenance

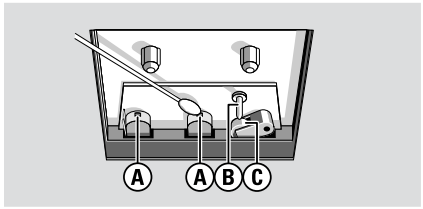
Cleaning the Cabinet
Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.

Cleaning Discs
When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the centre out.
Do not use solvents such as benzene, thinner, commercially available cleaners, or antistatic spray intended for analogue records.



Cleaning the disc lens
After prolonged use, dirt or dust may accumulate at the disc lens. To ensure good playback quality, clean the disc lens with Philips CD Lens Cleaner or any commercially available cleaner. Follow the instructions supplied with cleaner.

Cleaning the Heads and the Tape Paths
To ensure good recording and playback quality, clean the heads (A), the capstan(s) (B), and pressure roller(s) (C) after every 50 hours of tape operation.
Caution: Do not rotate the heads during cleaning.
Use a cotton swab slightly moistened with cleaning fluid or alcohol.
You can also clean the heads by playing a cleaning tape once.



Demagnetising the heads
Use a demagnetising tape available at your dealer.

Troubleshooting

WARNING
Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty. Do not open the system as there is a risk of electric shock.

If a fault occurs, first check the points listed below before taking the system for repair. If you are unable to remedy a problem by following these hints, consult your dealer or service center.

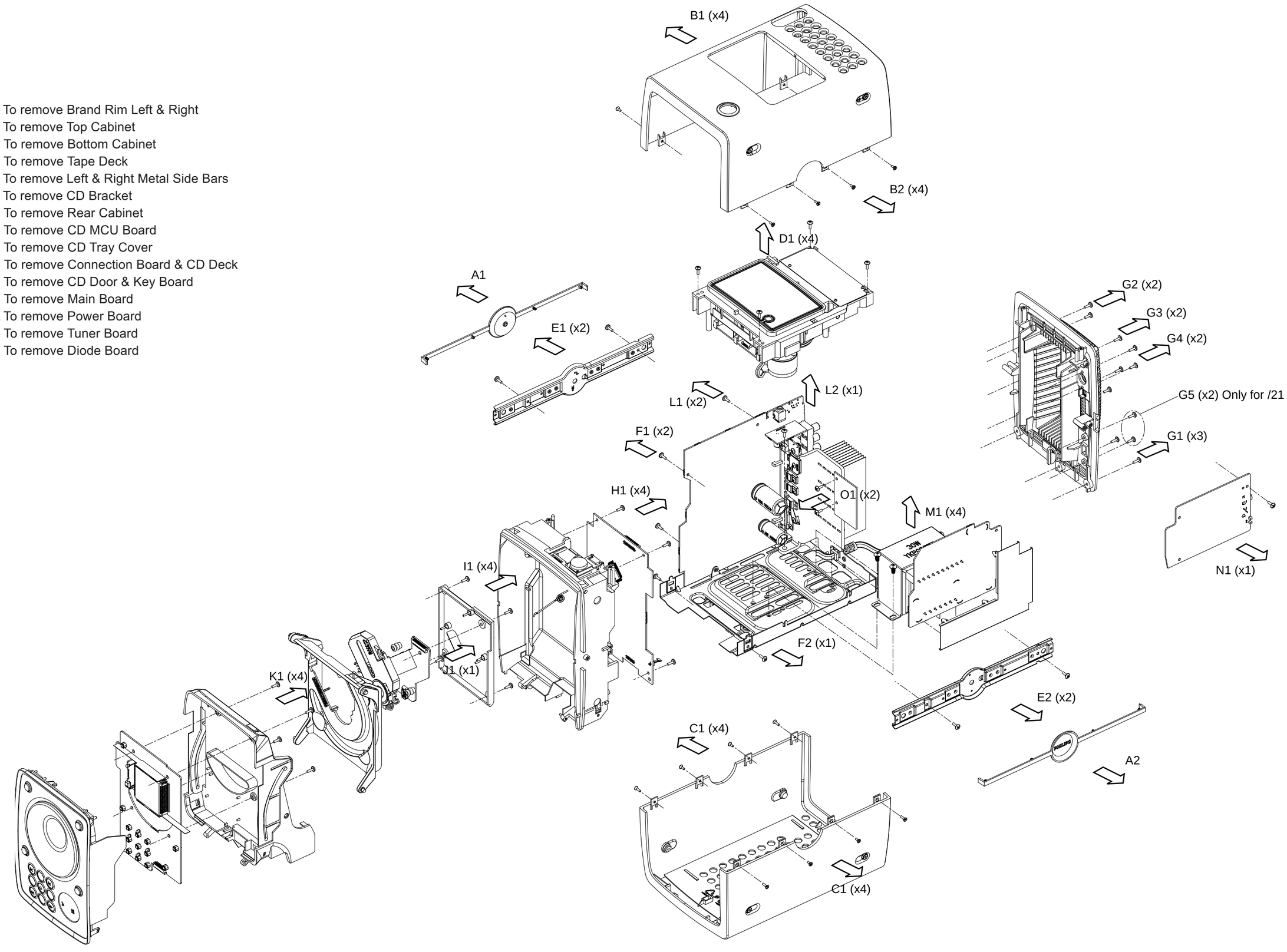
Problem	Solution
CD OPERATION	
"NO DISC" **is displayed.**	– Insert a disc. – Check if the disc is inserted upside down. – Wait until the moisture condensation at the lens has cleared. – Replace or clean the disc, see "Maintenance". – Use a finalised CD-RW or CD-R.

RADIO RECEPTION	
Radio reception is poor.	– If the signal is too weak, adjust the antenna or connect an external antenna for better reception. – Increase the distance between the Micro HiFi System and your TV or VCR.
TAPE OPERATION / RECORDING	
Recording or playback cannot be made.	– Clean deck parts, see "Maintenance". – Use only normal (IEC I) tape for recording.
"CHECK TAPE" **is displayed.**	– Apply a piece of adhesive tape over the missing tab space.
The tape deck door cannot open.	– Remove and reconnect the AC power plug and switch on the system again.
GENERAL	
The system does not react when buttons are pressed.	– Remove and reconnect the AC power plug and switch on the system again.
Sound cannot be heard or is of poor quality.	– Adjust the volume. – Disconnect the headphones. – Check that the speakers are connected correctly. – Check if the stripped speaker wire is clamped.
The left and right sound outputs are reversed.	– Check the speaker connections and location.
The remote control does not function properly.	– Select the source (CD or TUNER, for example) before pressing the function button (**>II**, **I<** ,**>I**). – Reduce the distance between the remote control and the system. – Insert the battery with its polarities (+/– signs) aligned as indicated. – Replace the battery. – Point the remote control directly toward IR sensor on the front of the system.
The timer is not working.	– Set the clock correctly. – Press TIMER ON / OFF to switch on the timer. – If a recording is in progress, stop the recording.
The Clock/Timer setting is erased.	– Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.

2-1

DISASSEMBLY INSTRUCTIONS

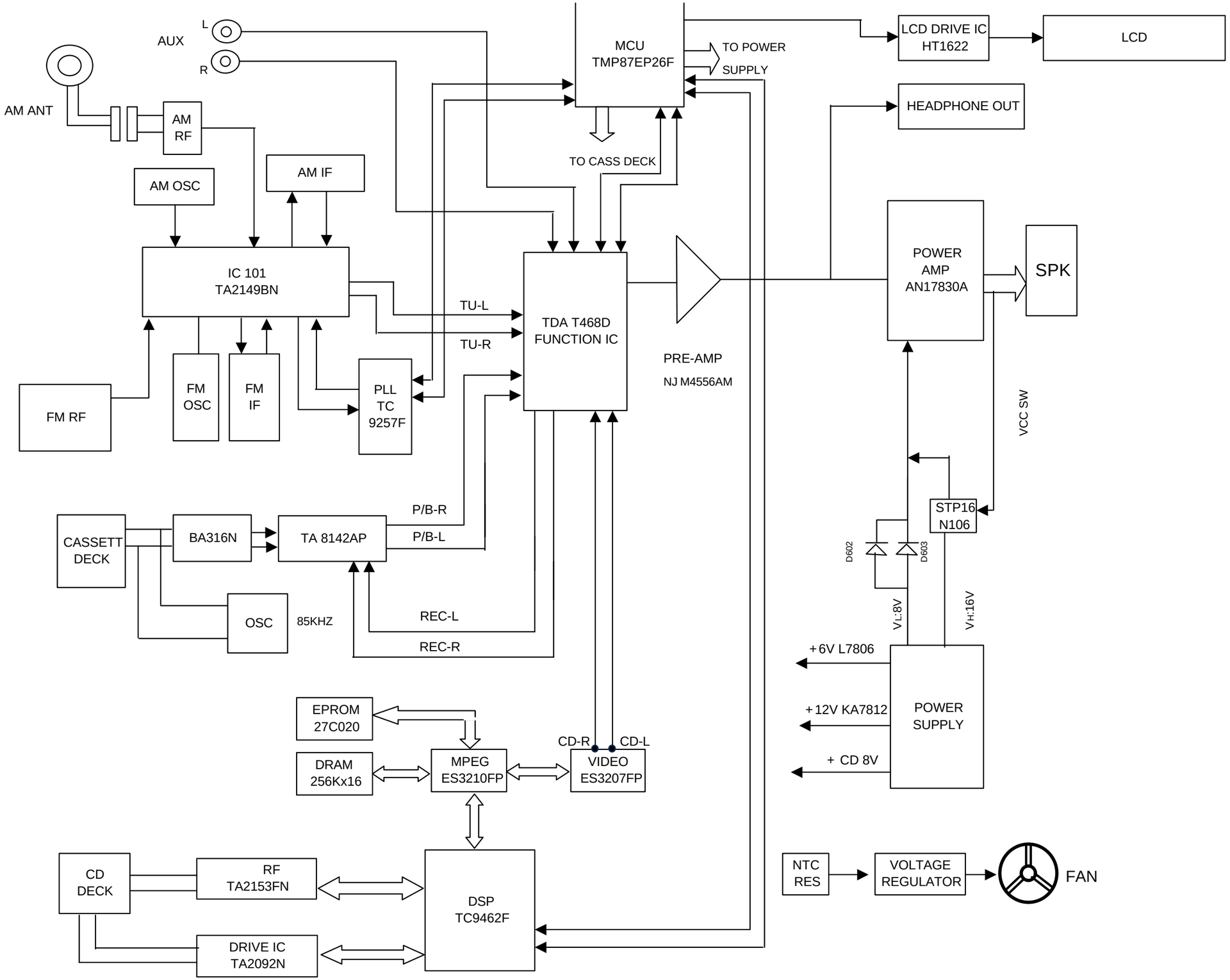
A. To remove Brand Rim Left & Right
B. To remove Top Cabinet
C. To remove Bottom Cabinet
D. To remove Tape Deck
E. To remove Left & Right Metal Side Bars
F. To remove CD Bracket
G. To remove Rear Cabinet
H. To remove CD MCU Board
I. To remove CD Tray Cover
J. To remove Connection Board & CD Deck
K. To remove CD Door & Key Board
L. To remove Main Board
M. To remove Power Board
N. To remove Tuner Board
O. To remove Diode Board



2-2

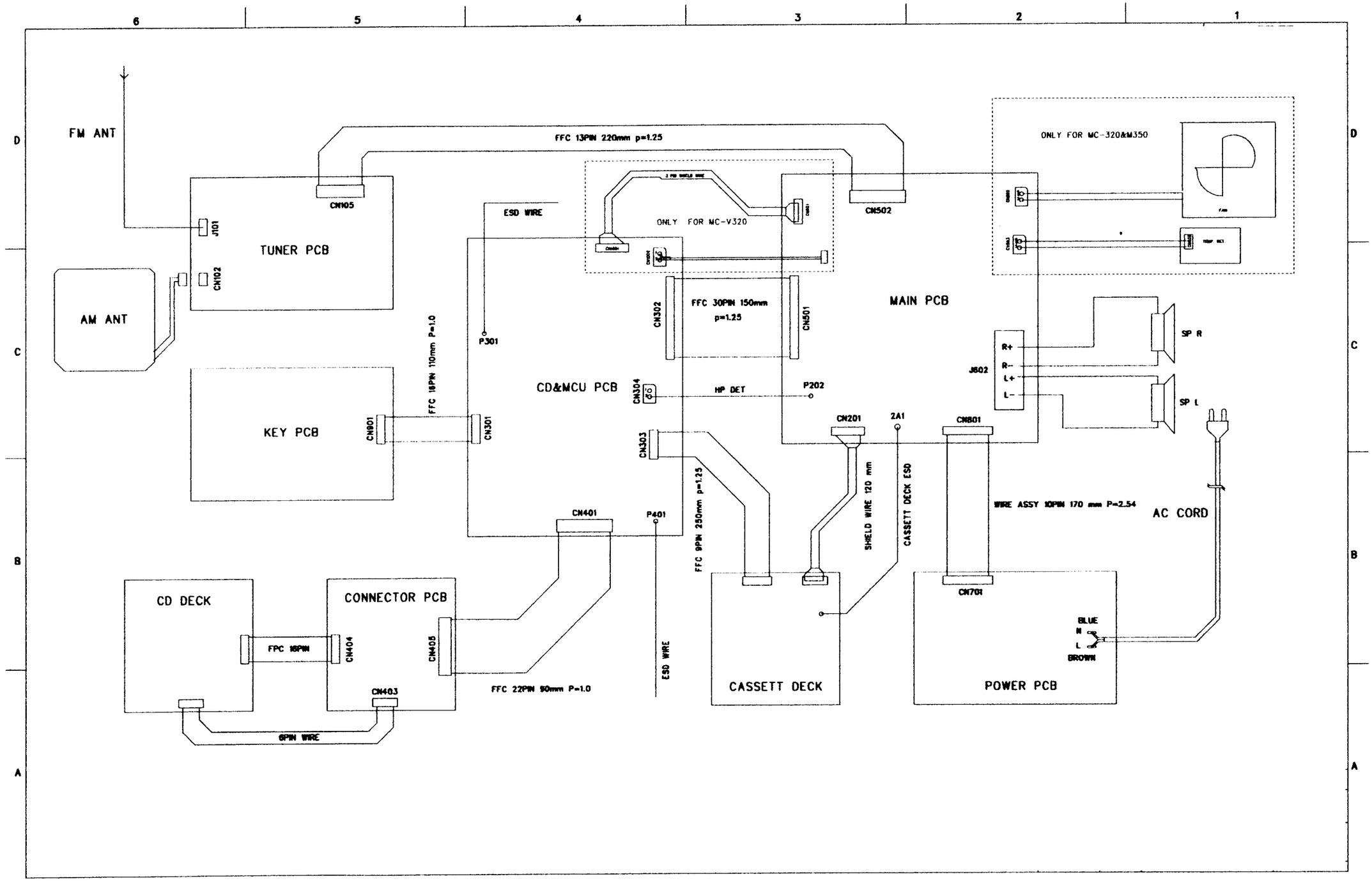
3-1

SET BLOCK DIAGRAM



4-1

SET WIRING DIAGRAM



KEY BOARD

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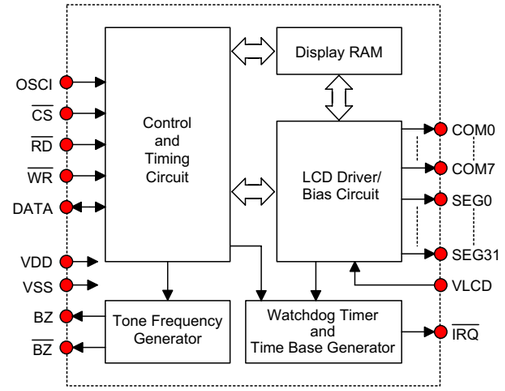
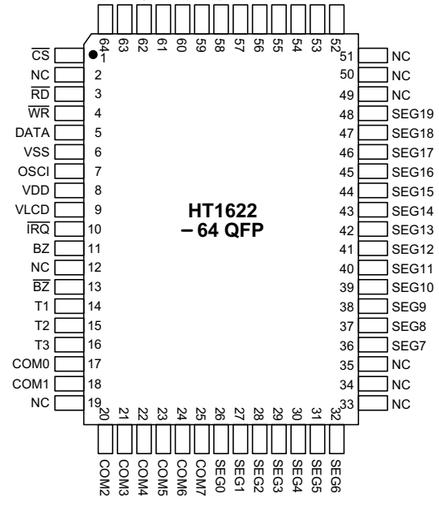
Layout Diagram-SMD 8-3
Electrical parts list 8-4

5-1

Block Diagram

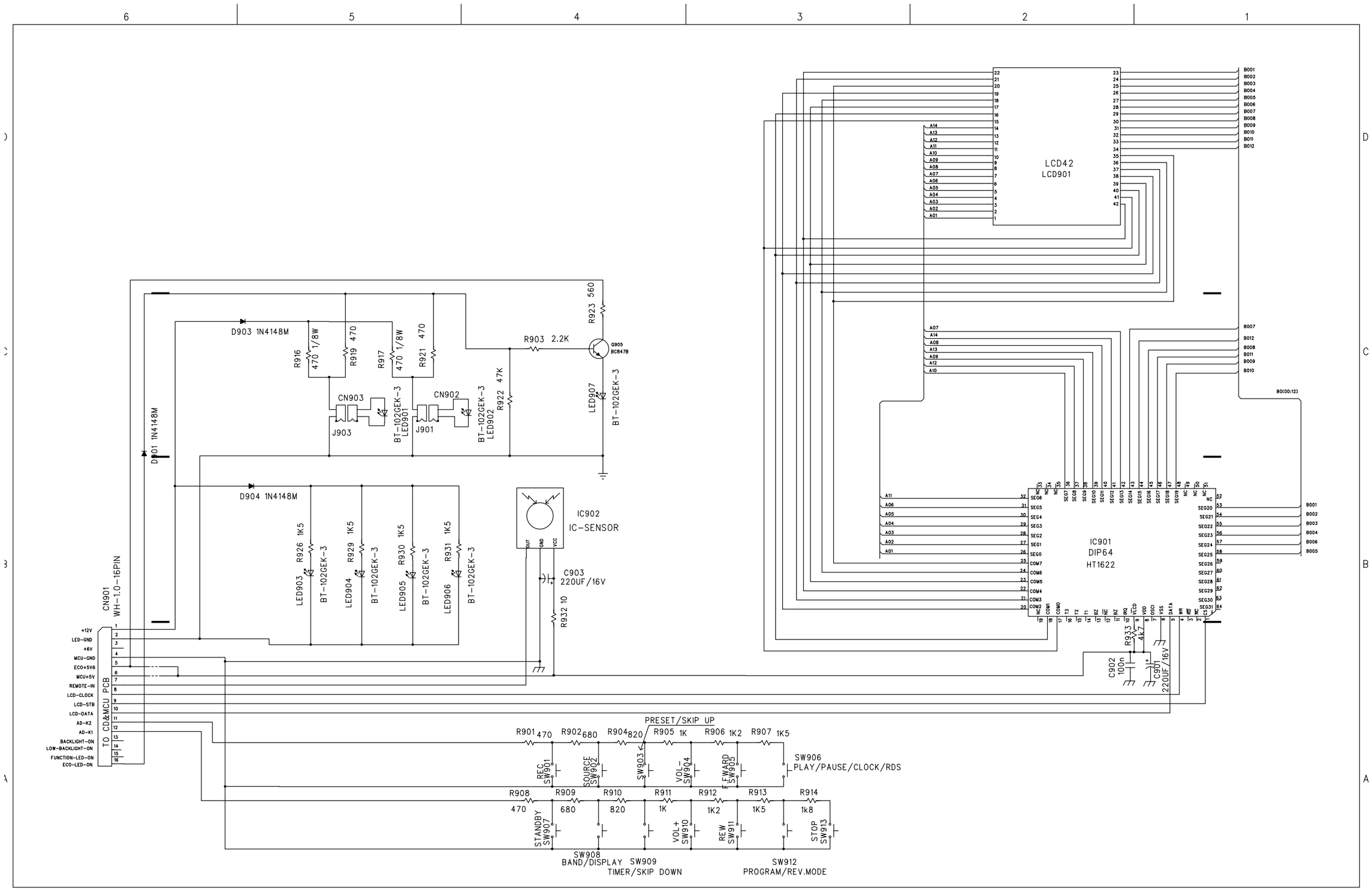


Pin Assignment

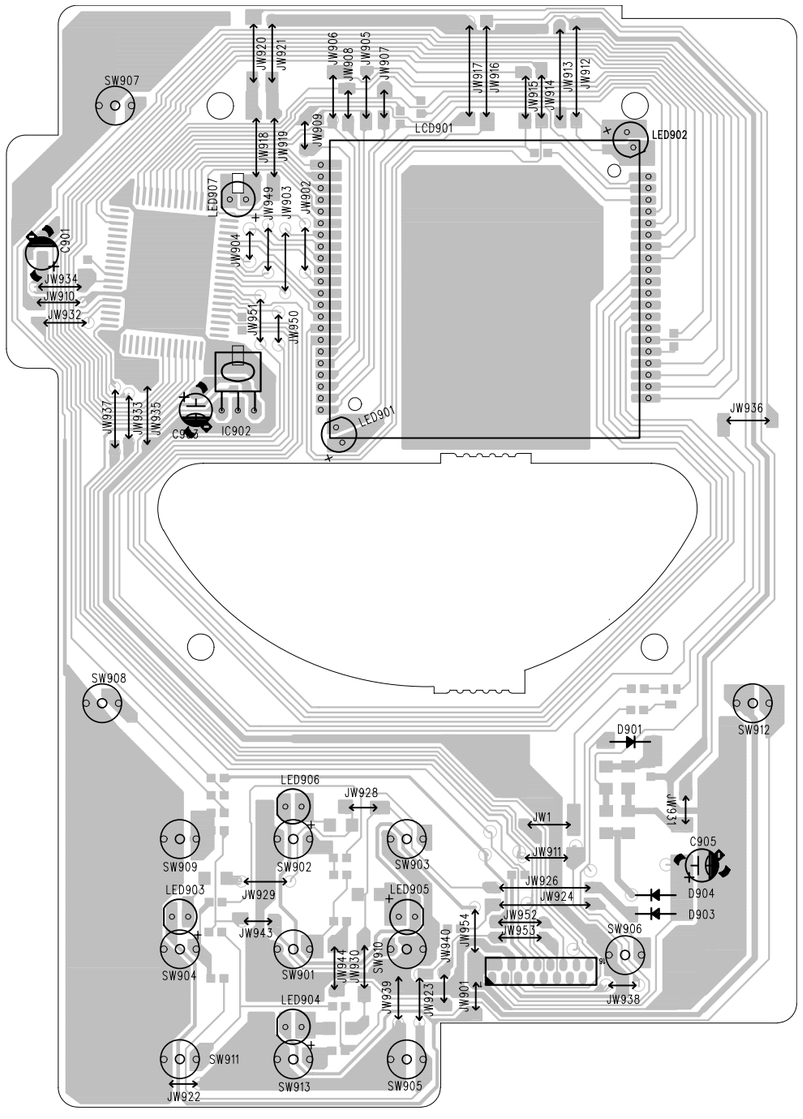


5-2

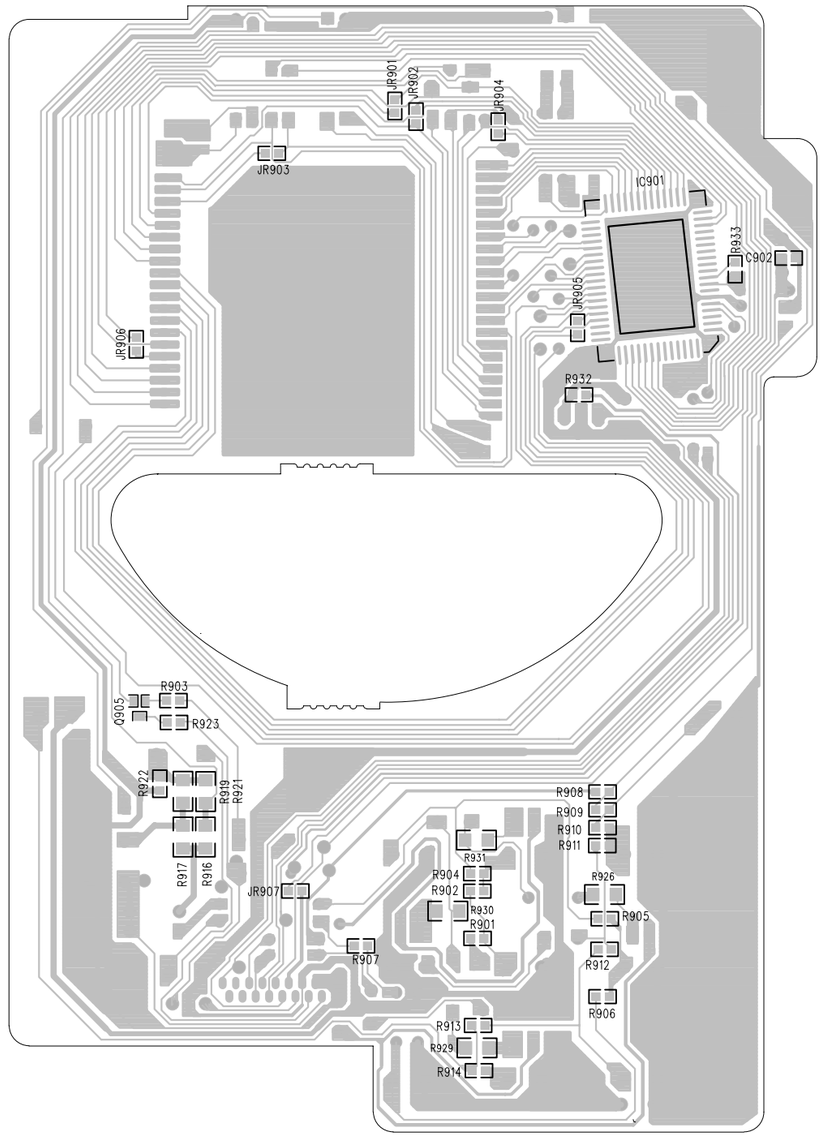
CIRCUIT DIAGRAM - FRONT BOARD



LAYOUT DIAGRAM - FRONT BOARD
COMPONENT SIDE



LAYOUT DIAGRAM - FRONT BOARD
SMD SIDE



5-4

ELECTRICAL PARTSLIST - KEY BOARD

- MISCELLANEOUS -

CN901	9965 000 18230	CONN 16P H P=1.0
LCD901	9965 000 18252	LCD MC320
LED901	9965 000 18253	LED WHITE
LED902	9965 000 18253	LED WHITE
LED903	9965 000 18254	LED GREEN
LED904	9965 000 18254	LED GREEN
LED905	9965 000 18254	LED GREEN
LED906	9965 000 18254	LED GREEN
LED907	9965 000 18304	LED BT-H203D-31 RED
SW901	4822 276 13775	SWITCH
SW902	4822 276 13775	SWITCH
SW903	4822 276 13775	SWITCH
SW904	4822 276 13775	SWITCH
SW905	4822 276 13775	SWITCH
SW906	4822 276 13775	SWITCH
SW907	4822 276 13775	SWITCH
SW908	4822 276 13775	SWITCH
SW909	4822 276 13775	SWITCH
SW910	4822 276 13775	SWITCH
SW911	4822 276 13775	SWITCH
SW912	4822 276 13775	SWITCH
SW913	4822 276 13775	SWITCH

- DIODES -

D901	4822 130 30621	1N4148
D903	4822 130 30621	1N4148
D904	4822 130 30621	1N4148

- IC & TRANSISTORS -

IC901	9965 000 18251	IC HT1622-64-QFP
IC902	9965 000 14545	SENSOR RECEIVER
Q905	5322 130 60159	BC846B

Note: Only these parts mentioned in the list are normal service parts.

6-1

POWER BOARD

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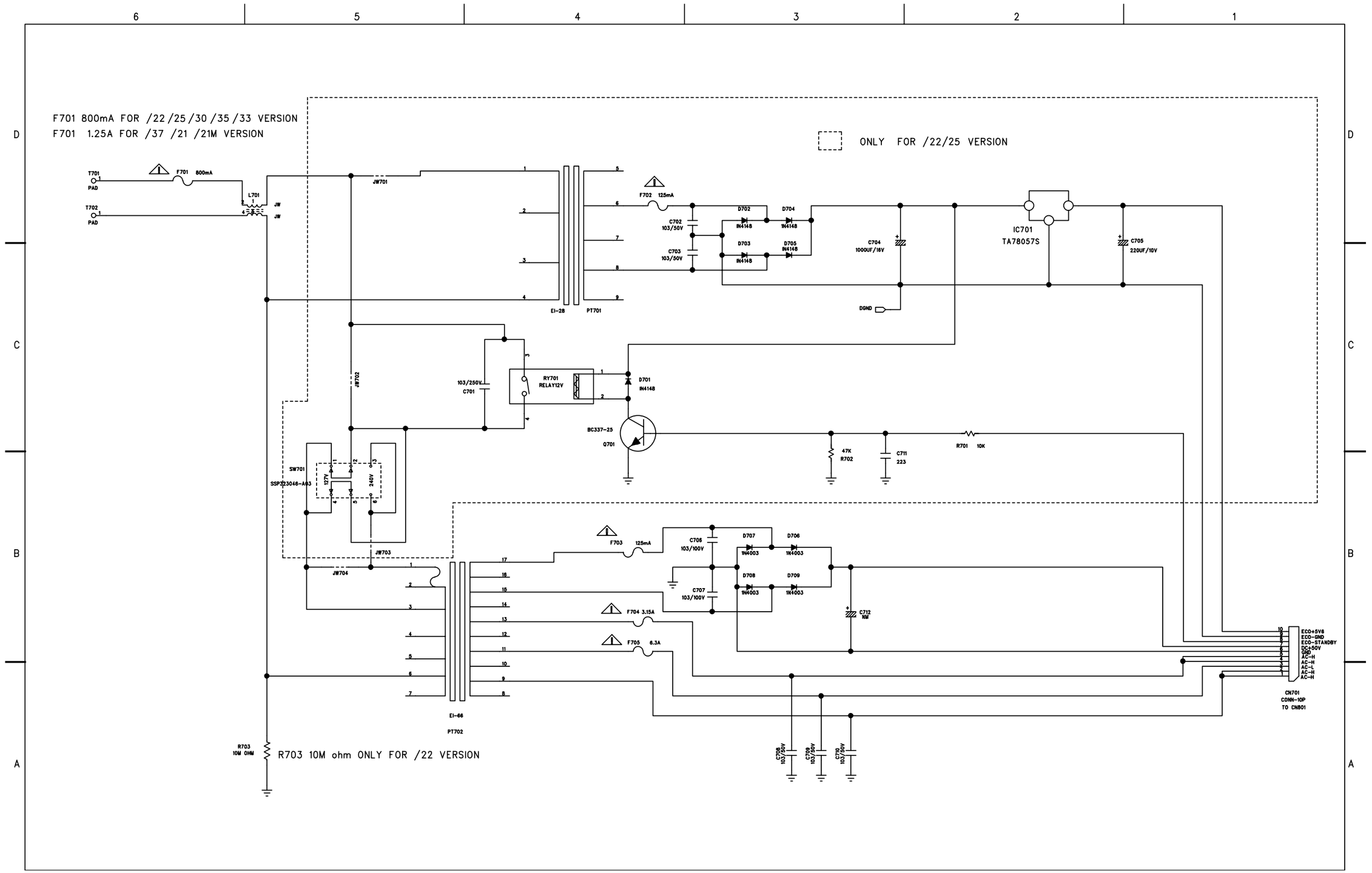
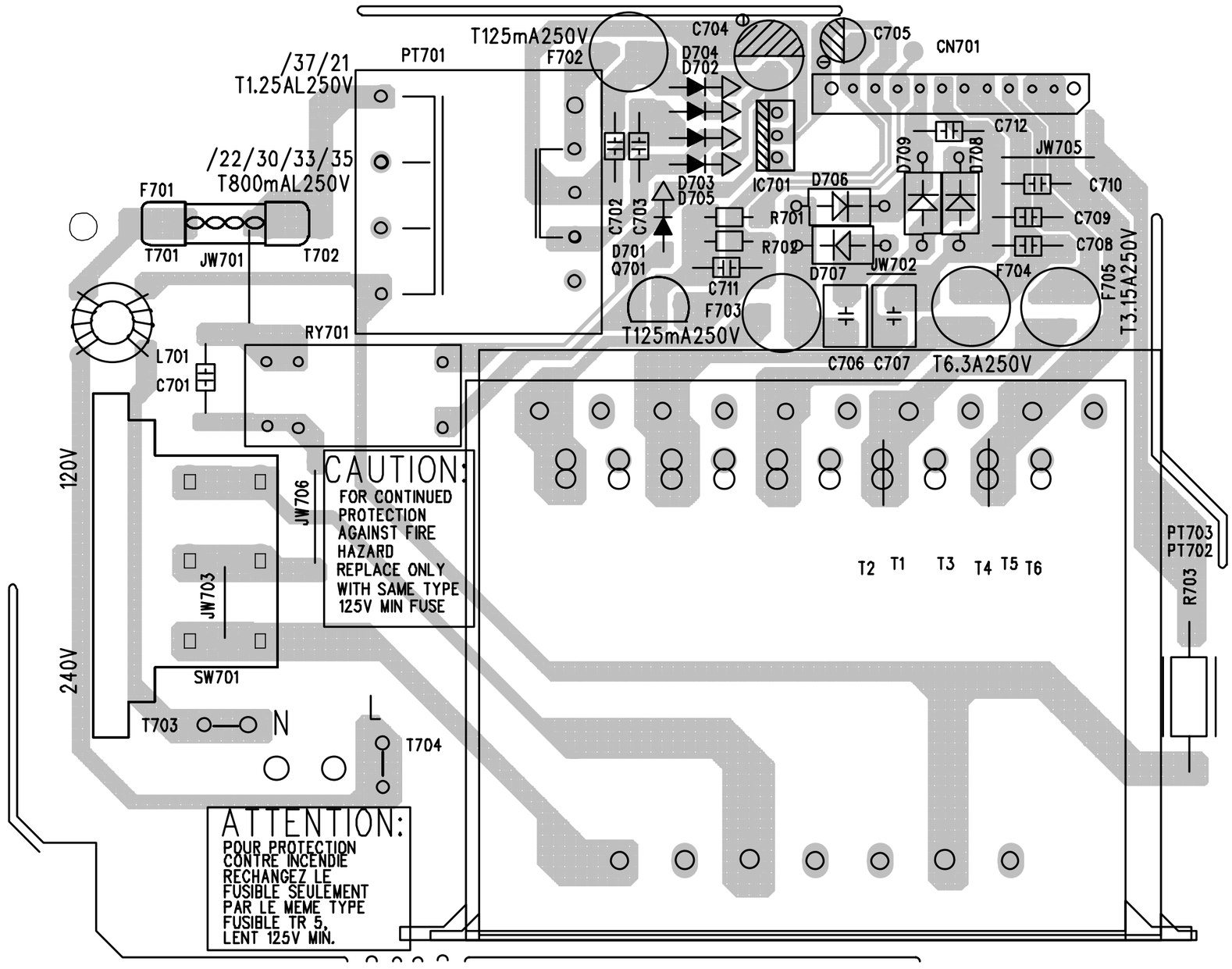
6-2

CIRCUIT DIAGRAM



6-3

POWER PCB LAYOUT



MC320POWER-MP.pcb – Wed Apr 02 20:04:13 2003

6-4

ELECTRICAL PARTSLIST - POWER BOARD

- MISCELLANEOUS -

CN701		9965 000 18244	CONN BASE 10P P=2.54
F701	⚠	9965 000 18245	FUSE 1.25A TSD 250V /21
F701	⚠	9965 000 11351	FUSE 800mA 250V /22/25
F703	⚠	9965 000 18246	FUSE 125mA TAPPING
F704	⚠	9965 000 18247	FUSE 6.3A TAPPING
F705	⚠	9965 000 18248	FUSE 3.15A TAPPING
PT701	⚠	9965 000 18302	POWER TRANS. EI-28 /22
RY701		9965 000 18303	RELAY /22/25
T701	⚠	9965 000 18249	FUSE CLAMP
T702	⚠	9965 000 18249	FUSE CLAMP
T703		9965 000 18250	CONNECTOR
T704		9965 000 18250	CONNECTOR
	⚠	9965 000 11348	VOLTAGE SELECTOR 2P 5A /21

- CAPACITORS -

C701	⚠	9965 000 18300	CAP CER. 0.01MF 250V 20%/22/25

- COILS & FILTERS -

L701	⚠	9965 000 11379	FILTER MAINS 400µH

- DIODES -

D701	4822 130 30621	1N4148 /22/25
D702	4822 130 30621	1N4148 /22/25
D703	4822 130 30621	1N4148 /22/25
D704	4822 130 30621	1N4148 /22/25
D705	4822 130 30621	1N4148 /22/25
D706	4822 130 31878	1N4003G
D707	4822 130 31878	1N4003G
D708	4822 130 31878	1N4003G
D709	4822 130 31878	1N4003G

- IC & TRANSISTORS -

IC701	9965 000 18301	TA78057S /22/25
Q701	4822 130 40981	BC337-25 /22/25

Note: Only these parts mentioned in the list are normal service parts.

7-1

TUNER BOARD

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Layout Diagram-SMD_Cenelec 7-13
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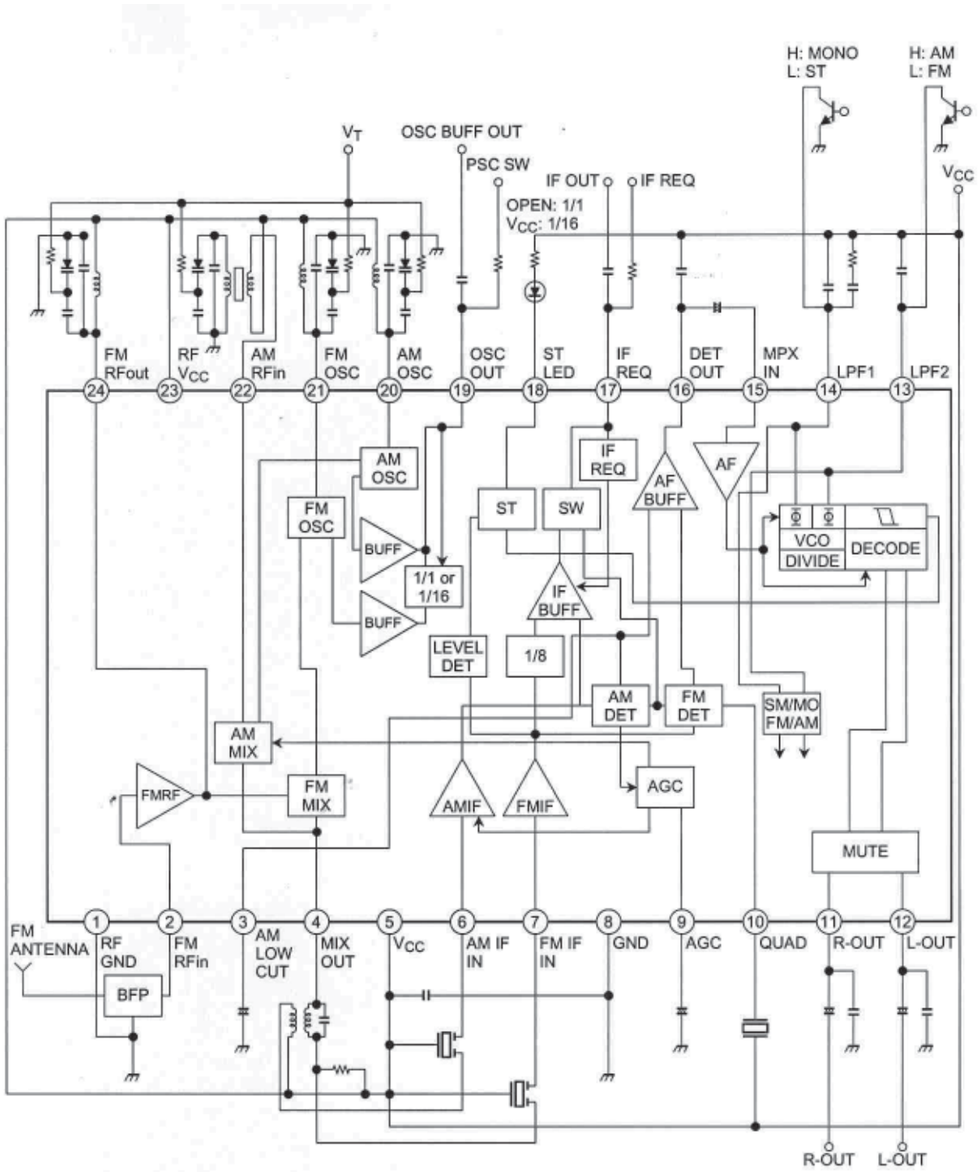
AM / FM TUNER IC
TA2149BN

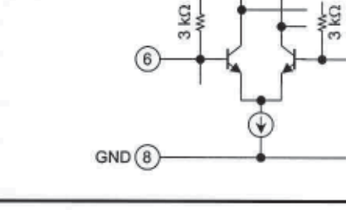
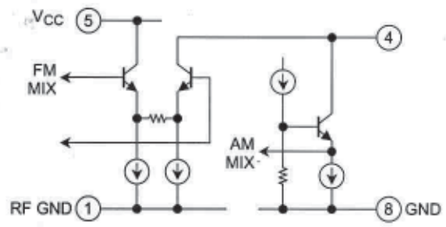
BLOCK DIAGRAM



7-2

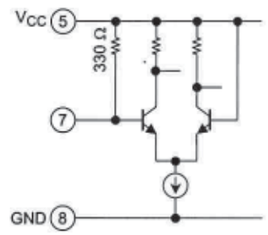
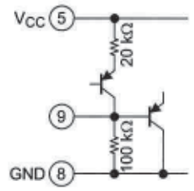
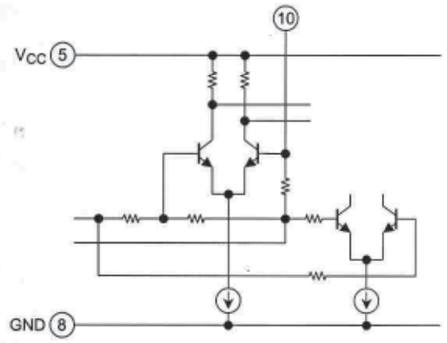
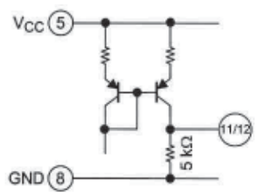
AM / FM TUNER IC
TA2149BN

Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V) AM	FM
1	RF GND (GND for FM RF stage)	—	0	0
2	FM-RFin		0	0.8
3	AM LOW CUT		1.0	—
4	MIX OUT		3.0	3.0
5	VCC (VCC for AM, FM IF, MPX)	—	3.0	3.0
6	AM IF IN		2.3	2.5

AM / FM TUNER IC
TA2149BN

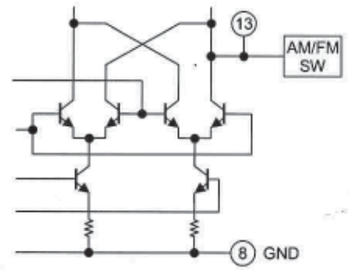
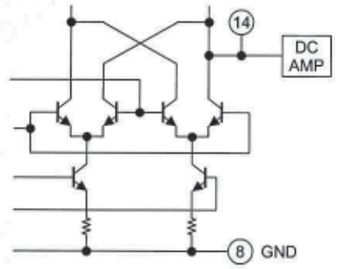
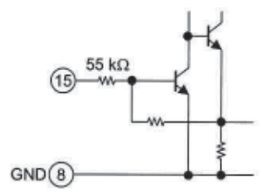
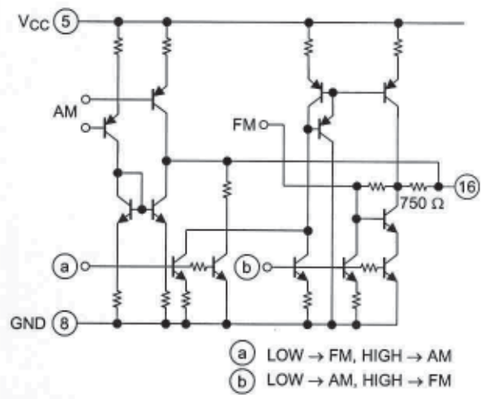
Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V) AM	FM
7	FM IF IN		3.0	3.0
8	GND (GND for AM, FM IF, MPX)	—	0	0
9	AGC		0	0
10	QUAD		2.5	2.2
11 12	R-OUT L-OUT		1.2	1.2

7-3

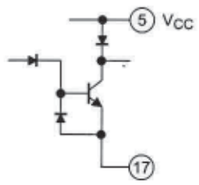
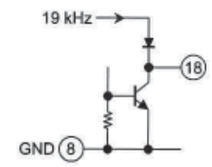
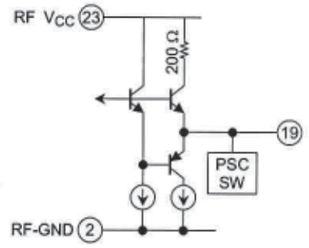
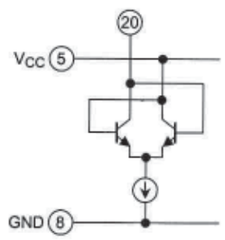
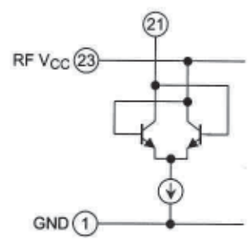
AM / FM TUNER IC
TA2149BN

Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V) AM	FM
13	LPF2 • LPF terminal for phase detector • Bias terminal AM/FM SW circuit V_{13} = GND → AM V_{13} = OPEN → FM		0	2.2
14	LPF1 • LPF terminal for synchronous detector • VCO stop terminal V_{14} = GND → VCO STOP		0.7	2.4
15	MPX IN		0.7	0.7
16	DET OUT		1.0	0.9

AM / FM TUNER IC
TA2149BN

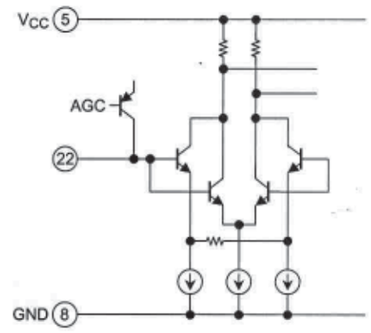
Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V) AM	FM
17	IF REQ		—	—
18	ST LED		—	—
19	OSC OUT		2.8	2.7
20	AM OSC		3.0	3.0
21	FM OSC		3.0	3.0

7-4

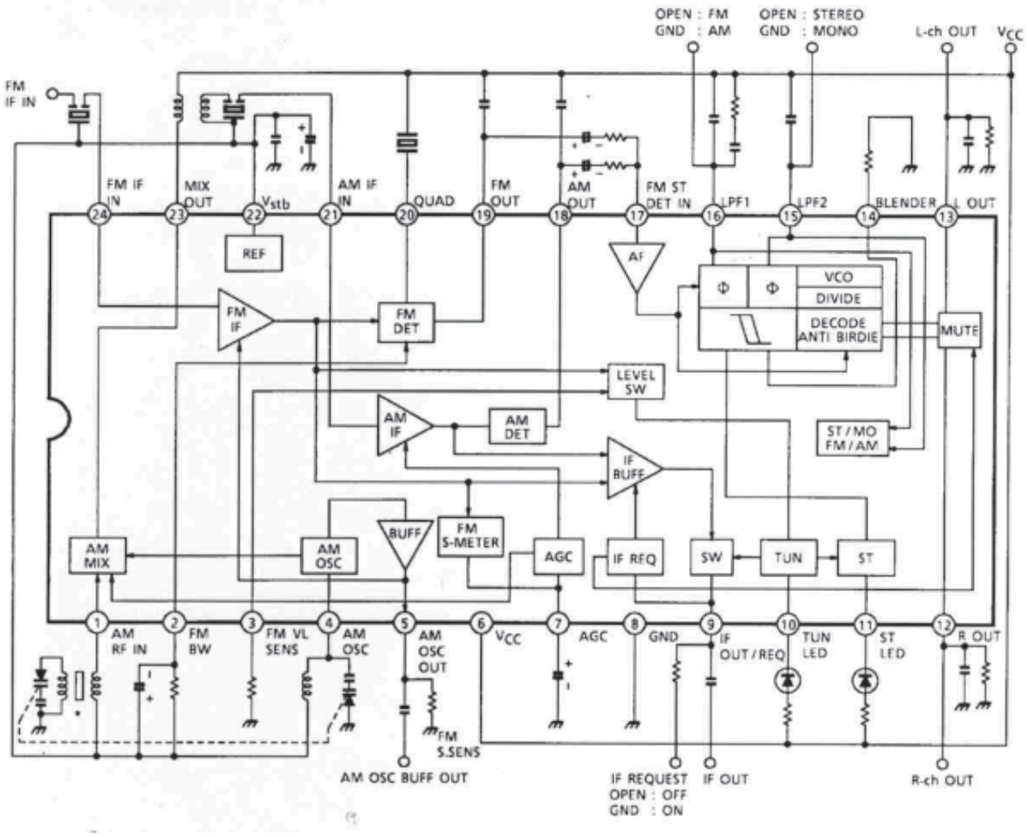
AM / FM TUNER IC
TA2149BN

Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V) AM	FM
22	AM RFin		3.0	3.0
23	RF Vcc (Vcc for FM RF stage)	—	3.0	3.0
24	FM RFout	cf. pin 1	3.0	3.0

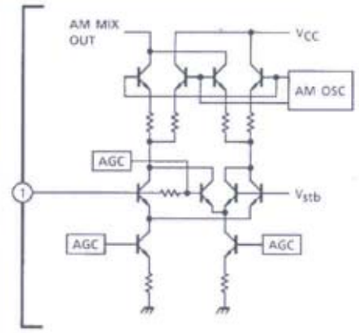
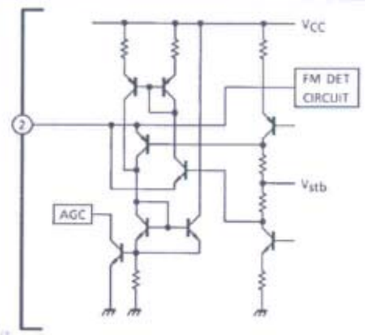
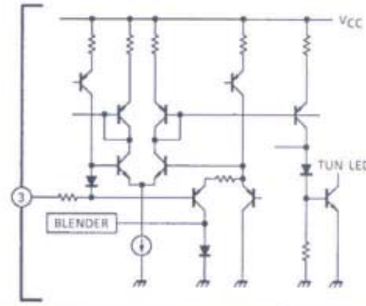
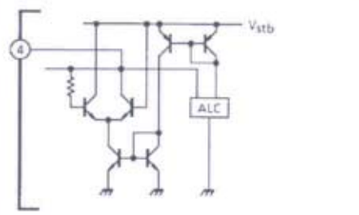
AM / FM IF + FM STEREO DETECTOR
TA2099N

BLOCK DIAGRAM



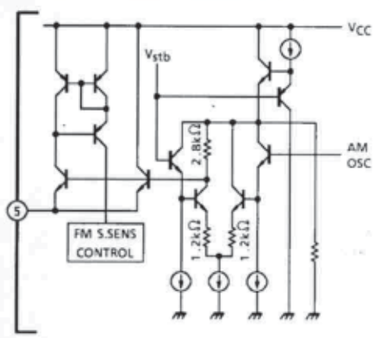
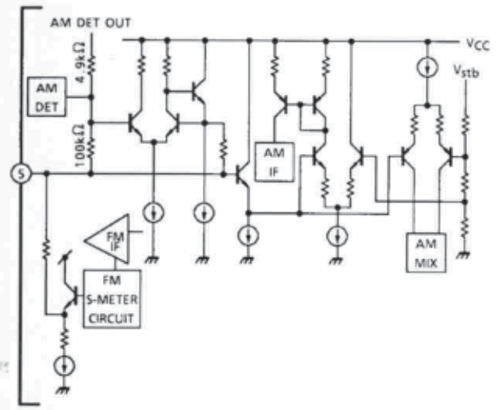
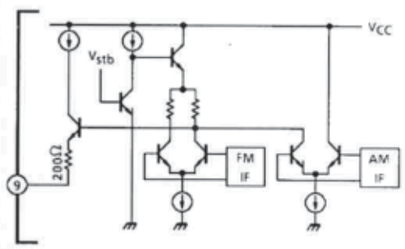
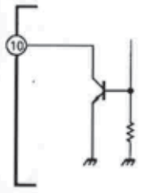
AM / FM IF + FM STEREO DETECTOR
TA2099N

Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V) FM	DC Voltage (V) AM
1	AM RF IN		2.0	2.0
2	FM BW • FM band width adjust terminal		2.0	2.0
3	FM VL SENS • FM LED ON sensitivity adjust terminal		0.1	0.1
4	AM OSC		2.0	2.0

AM / FM IF + FM STEREO DETECTOR
TA2099N

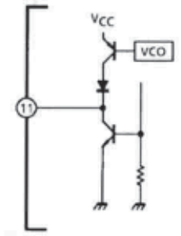
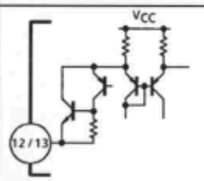
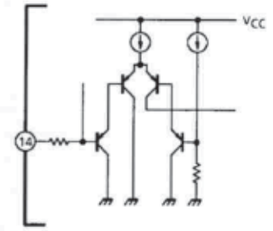
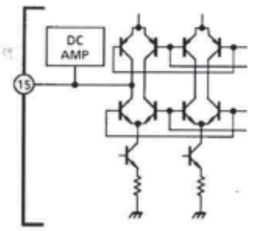
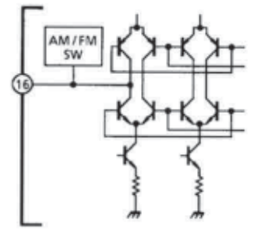
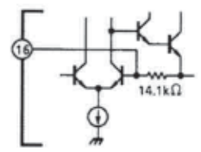
Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V) FM	DC Voltage (V) AM
5	AM OSC OUT/FM S.SENS • AM OSC Buff Output Terminal • FFM IF Count Output Sensitivity Adjust Terminal		1.3	1.3
6	VCC	—	5.0	5.0
7	AGC (FM S-METER)		0.2	1.3
8	GND	—	0	0
9	IF OUT/REQ • IF Count Output Terminal • IF Count Output/FM ST DET Mute Circuit Control Terminal SW_3: GND → ON SW_3: Open → OFF		—	—
10	TUN LED		—	—

7-6

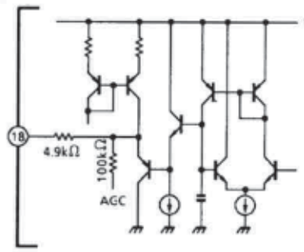
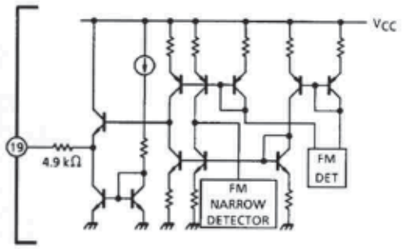
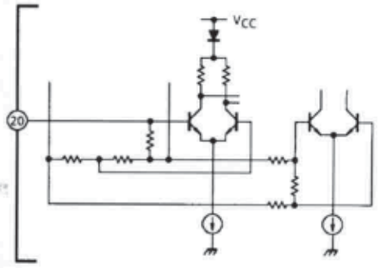
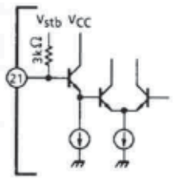
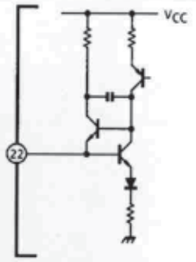
AM / FM IF + FM STEREO DETECTOR
TA2099N

Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V) FM	DC Voltage (V) AM
11	ST LED		—	—
12	R OUT		1.2	1.2
13	L OUT		1.2	1.2
14	BLENDER • FM Blender Control Adjust Terminal		0.3	0.3
15	LPF2 • LPF Terminal for Synchronous Detector • VCO Stop Terminal V_{15} = GND → VCO Stop (Monaural) V_{15} = Open → VCO Run (Stereo)		3.5	1.4
16	LPF1 • LPF Terminal for Phase Detector • Bias Terminal for AM/FM Switch Circuit V_{16} = GND → AM V_{16} = Open → FM		3.5	0
17	FM ST DET IN		1.2	1.2

AM / FM IF + FM STEREO DETECTOR
TA2099N

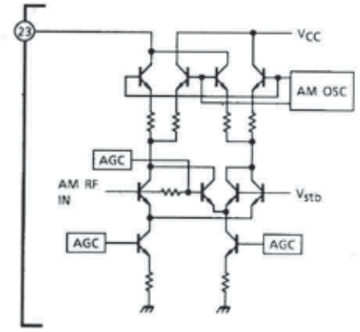
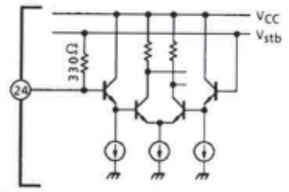
Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			FM	AM
18	AM DET OUT		0	1.3
19	FM DET OUT		1.4	2.0
20	QUAD		1.8	2.3
21	AM IF IN		2.0	2.0
22	V_{stb}		2.0	2.0

7-7

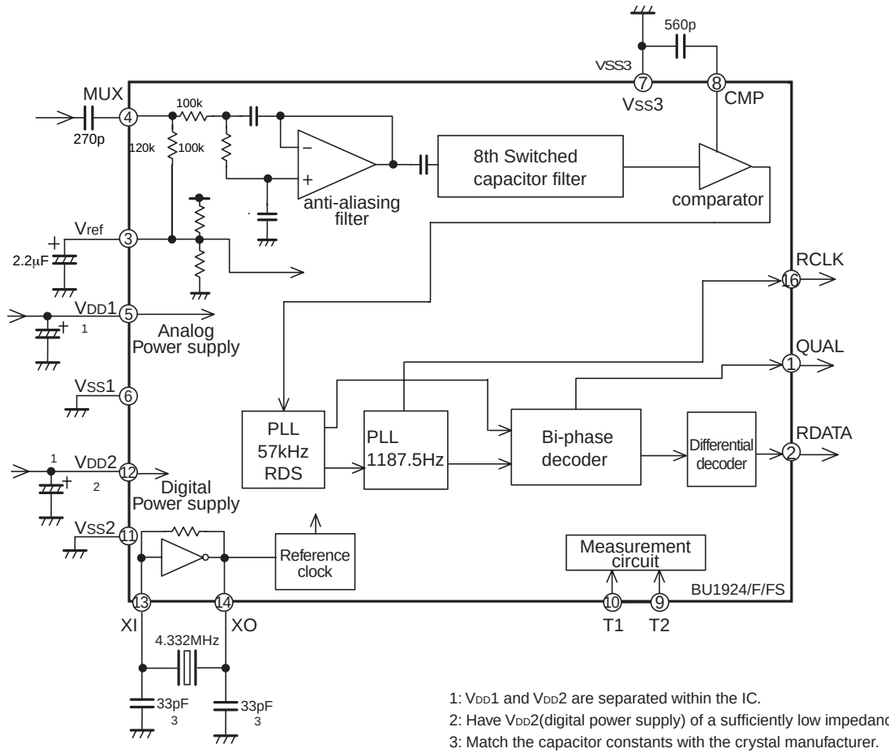
AM / FM IF + FM STEREO DETECTOR
TA2099N

Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			FM	AM
23	AM MIX OUT		5.0	5.0
24	FM IF IN		2.0	2.0

RDS/RBDS DECODER
BU1924F

BLOCK DIAGRAM



1: $V_{DD}1$ and $V_{DD}2$ are separated within the IC.
2: Have $V_{DD}2$(digital power supply) of a sufficiently low impedance.
3: Match the capacitor constants with the crystal manufacturer.

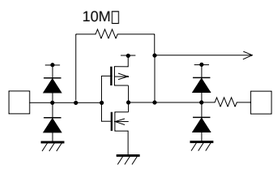
7-8

RDS/RBDS DECODER
BU1924F

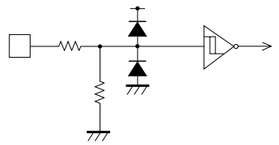
Pins Description

Pin No.	Symbol	Pin name	Functions	Input/Output type
1	QUAL	Demodulator quality	Good data: High, bad data : Low	Type C
2	RDATA	Demodulator data	Refer to output data timing	□
3	Vref	Reference voltage	1/2 V_{DD1} (refer to input/output circuits)	Type E
4	MUX	Input	Composite signal input (refer to input/output circuits)	Type D
5	V_{DD1}	Analog power supply	4.5V to 5.5V	□
6	V_{SS1}			
7	V_{SS3}	GND	□	□
8	CMP	Comparator input	C-junction (refer to input/output circuits)	Type D
9	T2	Test input	Open or connected to ground	Type B
10	T1			
11	V_{DD2}	Digital power supply	4.5V to 5.5V	□
12	V_{SS2}			
13	XI	Crystal oscillator	Connects to 4.332MHz oscillator (refer to input/output circuits)	Type A
14	XO			
15	(N.C.)	□	□	□
16	RCLK	Demodulator clock	1187.5Hz clock (refer to the timing diagram)	Type C

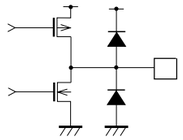
Type A



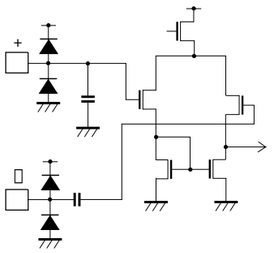
Type B



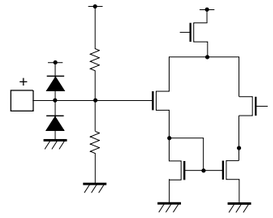
Type C



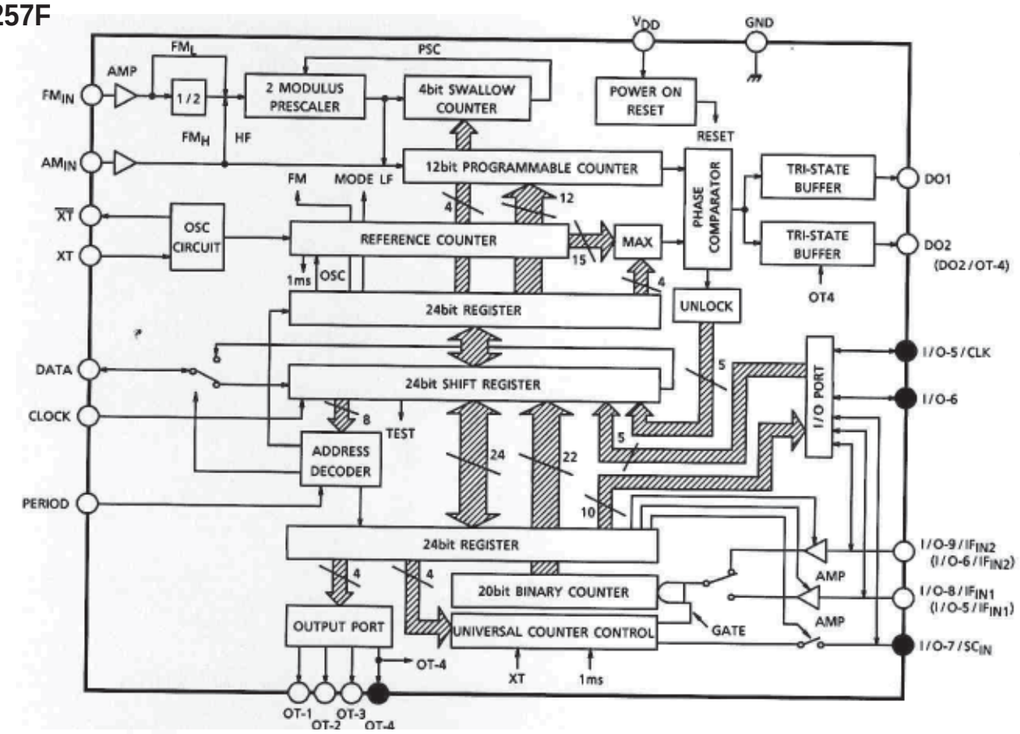
Type D



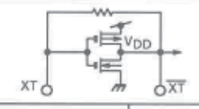
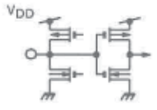
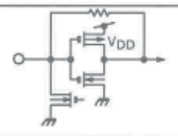
Type E



DIGITAL TUNING IC
TC9257F

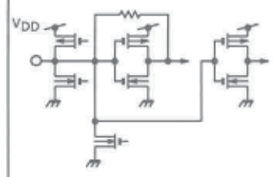
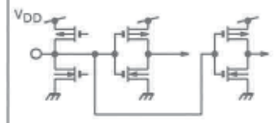
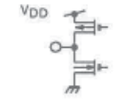


PIN FUNCTION

PIN No.	SYMBOL	PIN NAME	FUNCTION	CIRCUIT DIAGRAM
1	XT	Crystal oscillator pins	Connects 3.6MHz, 4.5MHz, 7.2MHz or 10.8MHz crystal oscillator to supply reference frequency and internal clock.	
2	$\overline{XT}$			
3	PERIOD	Period signal input	Serial I/O ports. These pins transfer data to and from the controller to set divisors and dividing modes, and to control the general-purpose counter and general-purpose I/O ports.	Schmitt input DATA; Schmitt input CLOCK, PERIOD
4	CLOCK	Clock signal input		
5	DATA	Serial data input/output		
6	OT-1	General-purpose output ports	N channel open drain port pins, for such uses as control signal output. These pins are set to the OFF state when power is turned on. (On TC9256P and TC9256F, OT-4 can be used as a CMOS output pin by switching it with DO2.)	N-channel open drain
7	OT-2			
8	OT-3			
9 (–)	OT-4			
10 (–)	I/O-5/CLK	General-purpose I/O ports	CMOS structure allows free use of these ports for input or output. Ports are set for input when the power is turned on. On TC9257P and TC9257F, I/O-5 can be switched for use as a system clock output pin.	
11 (–)	I/O-6			
13 (10)	AM_{IN}	Programmable counter input	These pins input FM and AM band local oscillator signals by capacitor coupling. FM_{IN} and AM_{IN} operate at low amplitude.	
14 (11)	FM_{IN}			

7-9

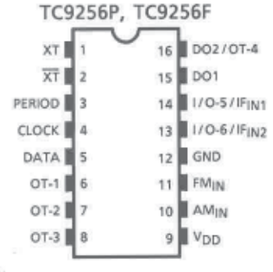
DIGITAL TUNING IC
TC9257F

PIN No.	SYMBOL	PIN NAME	FUNCTION	CIRCUIT DIAGRAM
16 (13)	I/O-9 (-6) /IF_{IN2}	General-purpose I/O ports / General-purpose counter frequency measurement input	General-purpose I/O port input/output pins. Can be switched for use as input pins to measure general-purpose counter frequencies. The frequency measurement function has such uses as measuring intermediate frequencies (IF). These pins feature built-in amps. Data are input by capacitor coupling. FM_{IN} and AM_{IN} operate at low amplitude. (Note) Pins are set for input when power is turned on.	
17 (14)	I/O-8 (-5) /IF_{IN1}			
18 (–)	I/O-7 /SC_{IN}	General-purpose I/O ports / General-purpose counter cycle measurement input	General-purpose I/O port input/output pin. Can be switched for use as signal input pin to measure low-frequency signal cycles. (Not available on TC9256P and TC9256F.) (Note) This pin is set for input when power is turned on.	
19 (15)	DO1	Phase comparator output (General-purpose output ports)	These pins are for phase comparator tristate output. DO1 and DO2 are output in parallel. (On TC9256P and TC9256F, DO2 can be switched for use as a general-purpose output port.)	
20 (16)	DO2 (DO2 /OT-4)			
15 (12)	GND	Power supply pins	Applies 5.0V ± 10%.	—
12 (9)	V_{DD}			

(*) Pin numbers 1~8 are common to TC9256P, TC9256F, TC9257P and TC9257F.
(*) Pin names and numbers in parentheses apply to TC9256P and TC9256F.

PIN CONNECTION

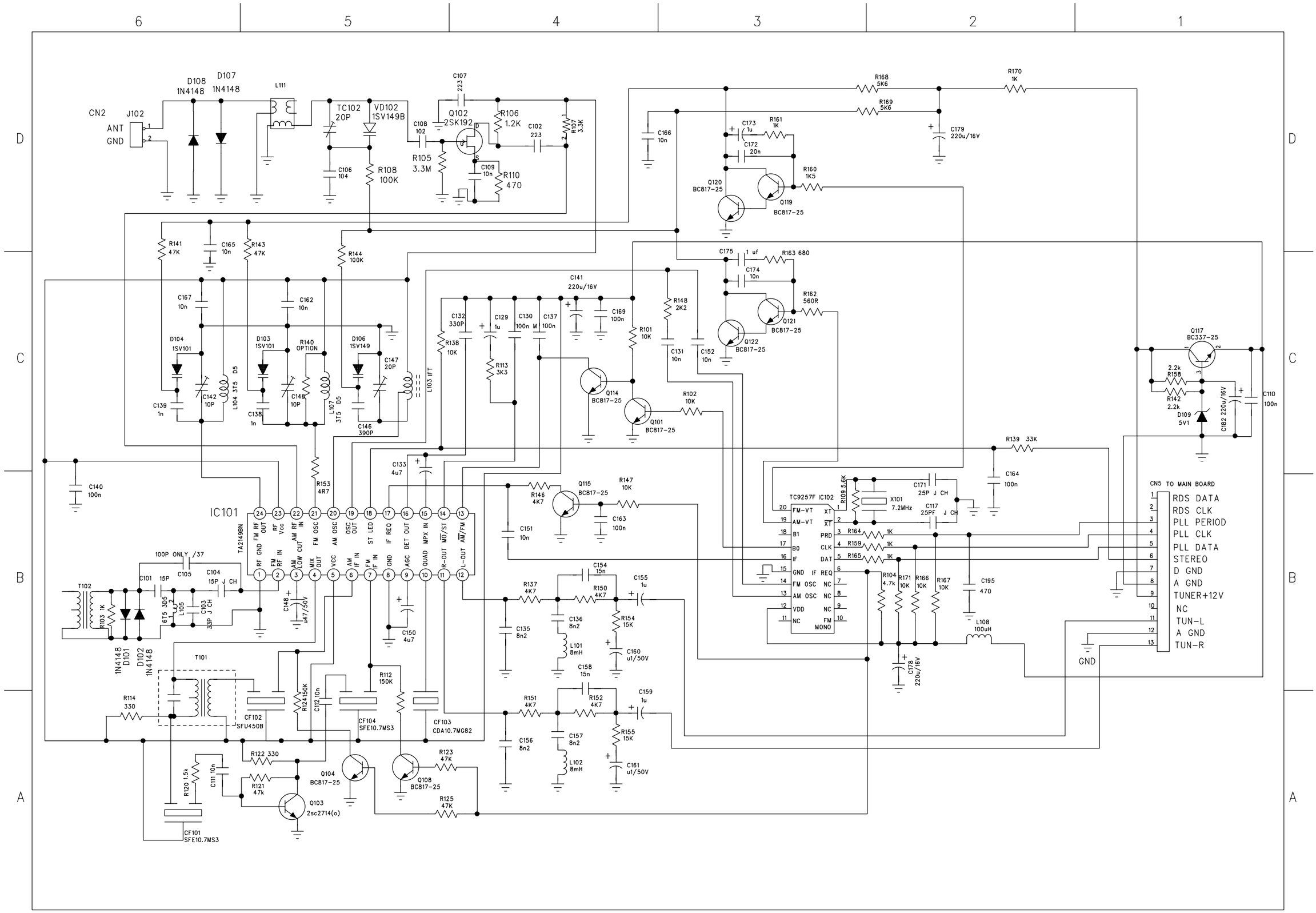
TC9256P, TC9256F



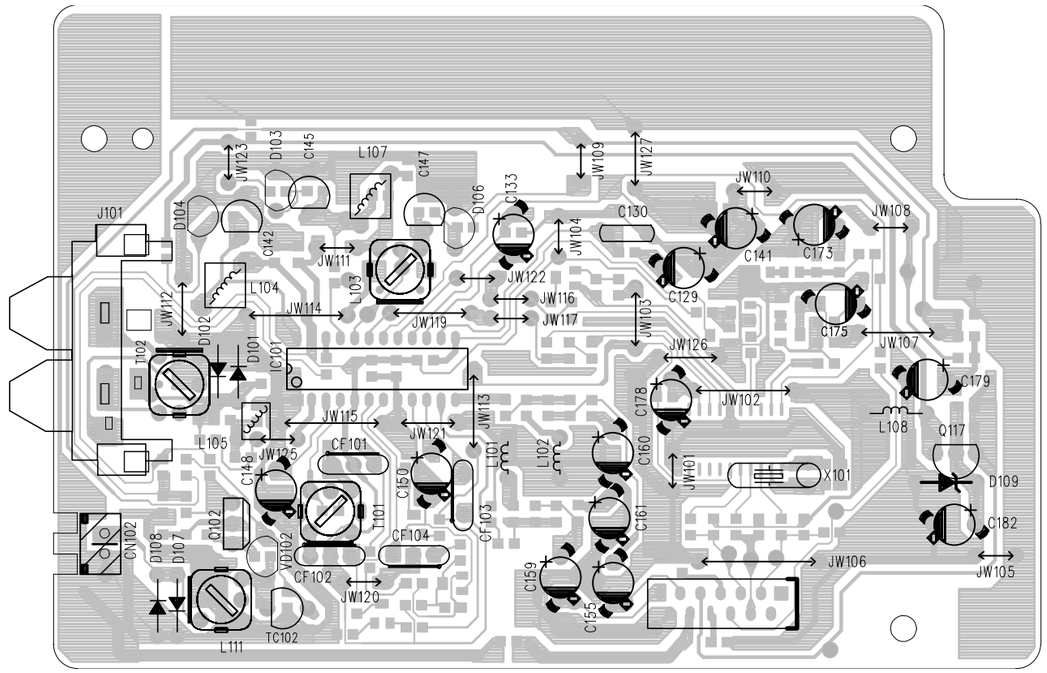
Top View
DIP-16PIN/SOP-16PIN

7-10

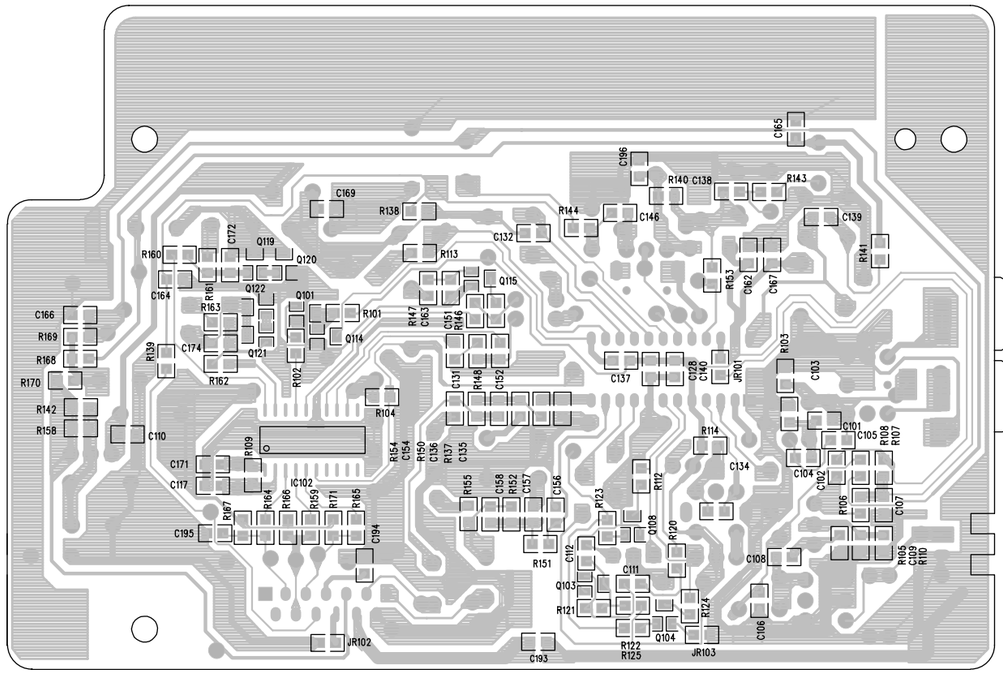
CIRCUIT DIAGRAM - TUNER BOARD (NON CENELEC)



LAYOUT DIAGRAM - TUNER BOARD (NON CENELEC)
COMPONENT SIDE

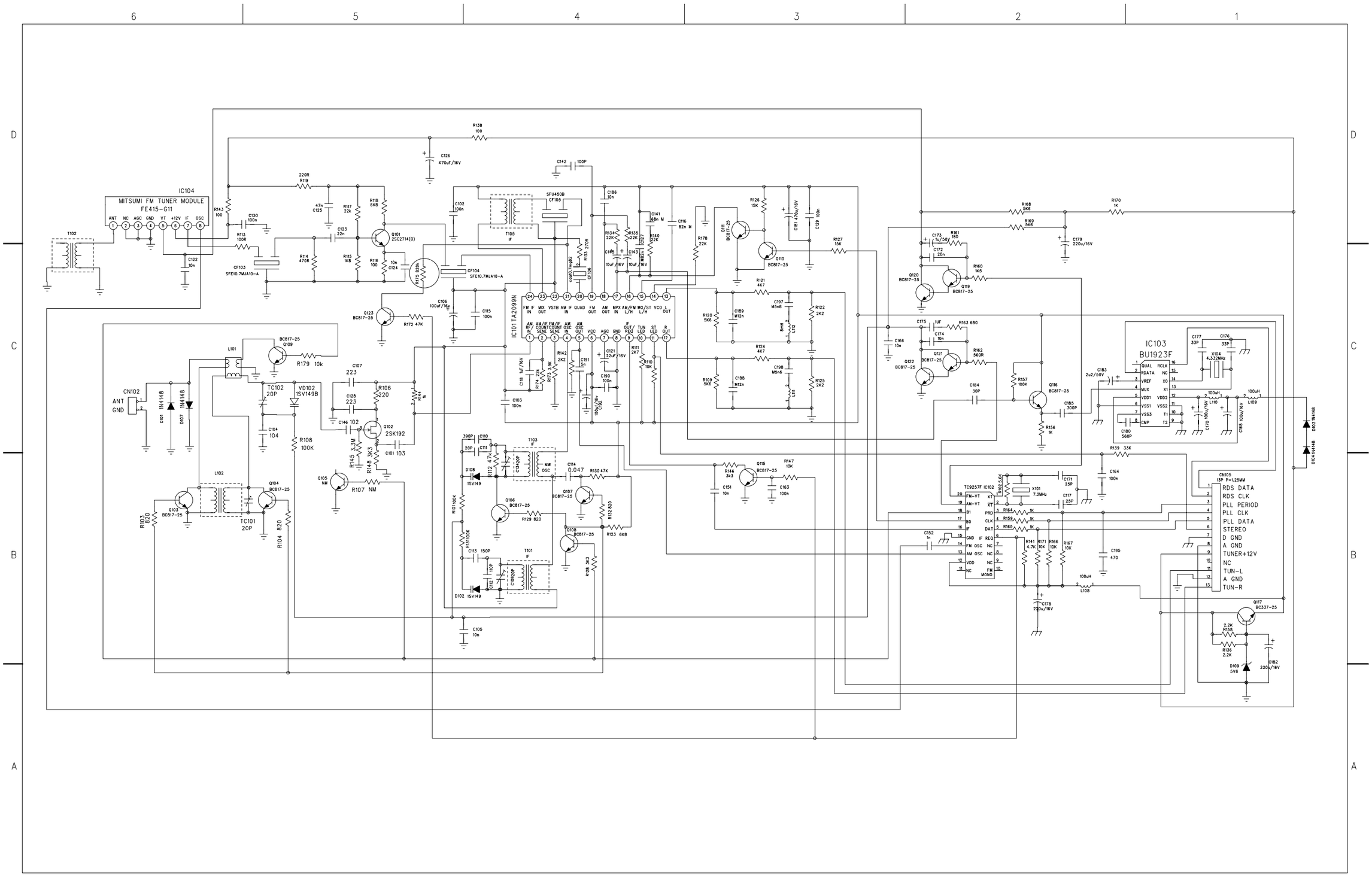


LAYOUT DIAGRAM - TUNER BOARD (NON CENELEC)
COPPER SIDE

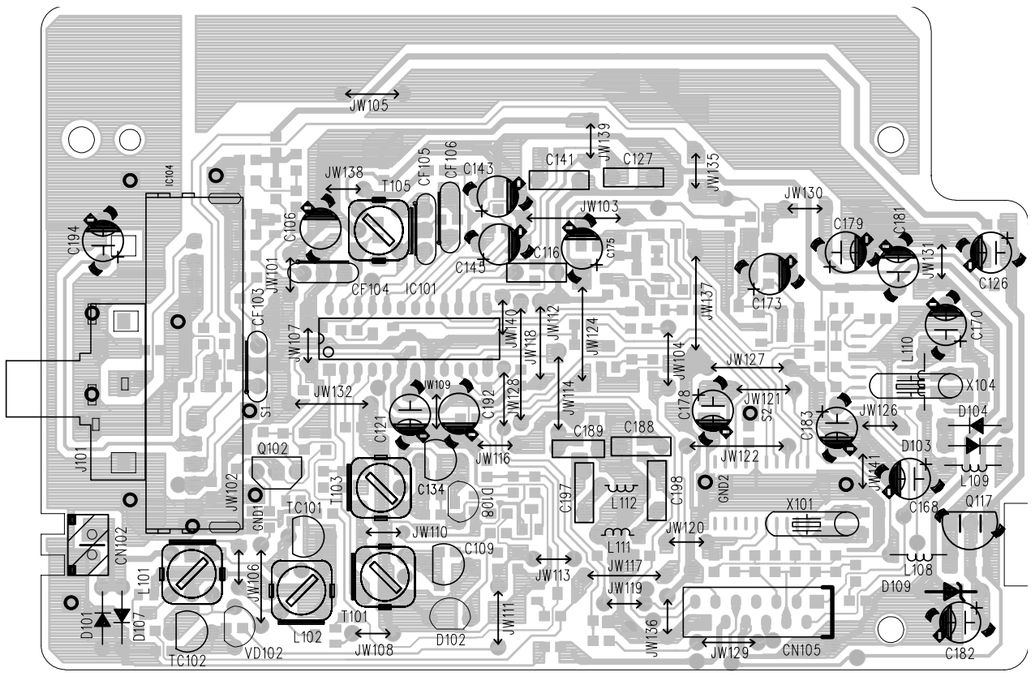


7-12

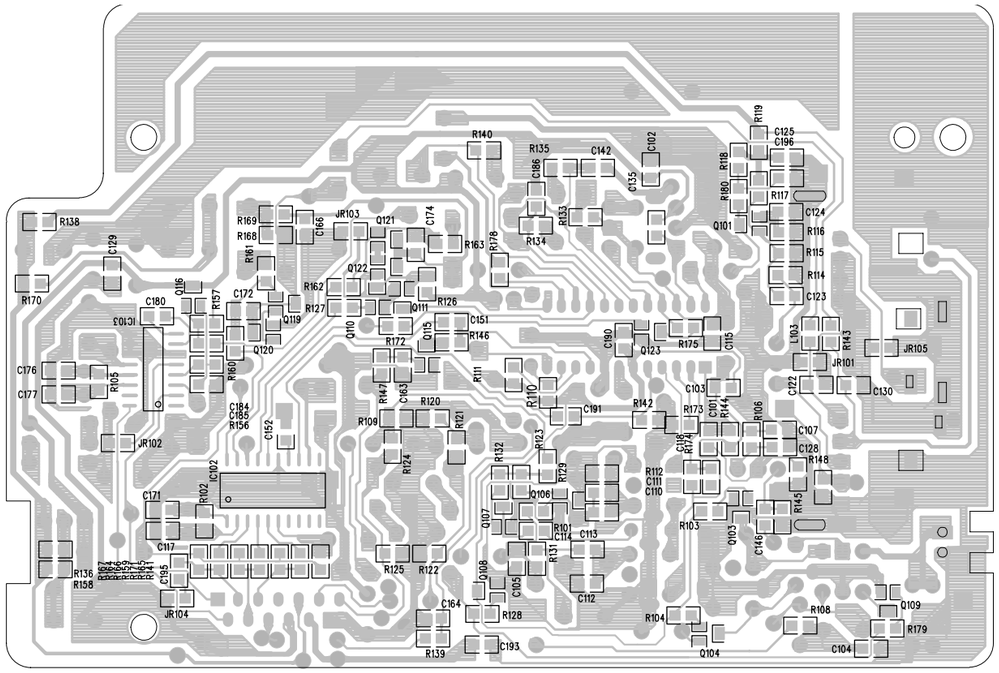
CIRCUIT DIAGRAM - TUNER BOARD (CENELEC)


IC104
MITSUMI FM TUNER MODULE
FE415-G11
ANT NC AGC GND VT +12V IF OSC
IC101 TA2099N
FM IF IN
MIX OUT
VSTB
AM IF IN
QUAD OSC IN
FM OUT
AM OUT
MPX IN
AM/FM L/R
MO/ST L/H
VCO OUT
AN RF IN
AM/F COUNT SENS
FM/F COUNT SENS
AM OSC OUT
VCC
AGC
GND
IF OUT
IF REG
TUN LED
ST LED
R OUT
IC103
BU1923F
QUAL
RDATA
VREF
MUX
VDD1
VSS1
VSS2
VSS3
CMP
RCLK
NC
XO
X1
VDD2
T1
T2
IC102
TC9257F
FM-VT
AM-VT
B1
B0
IF
GND
FM OSC
AM OSC
VDD
NC
XT
PRD
CLK
DAT
IF REQ
NC
FM MONO
CN105
13P P=1.25MM
RDS DATA
RDS CLK
PLL PERIOD
PLL CLK
PLL DATA
STEREO
D GND
A GND
TUNER+12V
NC
TUN-L
A GND
TUN-R
CN102
ANT
GND
T102
T105 IF
T103 IF
T101 IF
L101
L102
L108
L109
L110
L112
L111
SFU450B
CF105
CF103 SFE10.7MJA10-A
CF104 SFE10.7MJA10-A
CF106 cdst0.7mgb2
X104 4.332MHz
X101 7.2MHz
TC101 20P
TC102 20P
VD102 1SV149B
D108 1SV149
D102 1SV149
D101 1N4148
D107 1N4148
D103 1N4148
D104 1N4148
D139 5V6
Q101 2SC2714(O)
Q102 2SK192
Q103 BC817-25
Q104 BC817-25
Q105 NM
Q106 BC817-25
Q107 BC817-25
Q108 BC817-25
Q109 BC817-25
Q110 BC817-25
Q111 BC817-25
Q115 BC817-25
Q116 BC817-25
Q117 BC337-25
Q119 BC817-25
Q120 BC817-25
Q121 BC817-25
Q122 BC817-25
Q123 BC817-25
R107 NM
R179 10k
R172 47K
R123 6K8
R129 820
R132 820
R103 820
R104 820
R108 100K
R101 100K
R131 100K
R130 47K
R147 10K
R110 10K
R111 2K7
R121 4K7
R124 4K7
R122 2K2
R125 2K2
R120 5K6
R109 5K6
R126 15K
R127 15K
R178 22K
R134 22K
R135 22K
R140 22K
R133 270R
R138 100
R139 3.3K
R146 3K3
R148 3K3
R145 3.3M
R128 3K3
R142 2K2
R144 1K
R156 1K
R157 100K
R158 2.2K
R136 2.2K
R141 4.7K
R171 10K
R166 10K
R167 10K
R168 5K6
R169 5K6
R170 1K
R161 180
R162 560R
R163 680
R160 1K5
R164 1K
R159 1K
R165 1K
R102 2.5K
R114 470R
R115 1K8
R116 100
R117 22K
R118 6K8
R113 100R
R119 220R
R143 100
R175 820K
R174 22K
R173 3.3K
C126 470uF/16V
C142 100P
C186 10n
C102 100n
C130 100n
C122 10n
C123 22n
C125 47n
C124 10n
C106 100uF/16V
C115 100n
C116 82n M
C141 68n M
C127 M82n
C143 10uF/16V
C145 10uF/16V
C181 470u/16V
C129 100n
C179 220u/16V
C173 1u/50V
C172 20n
C174 10n
C175 1UF
C166 10n
C184 30P
C185 300P
C183 2u2/50V
C177 33P
C176 33P
C180 560P
C170 100u/16V
C168 100u/16V
C164 100n
C171 25P
C117 25P
C195 470
C178 220u/16V
C182 220u/16V
C152 In
C151 10n
C163 100n
C105 10n
C113 150P
C112 110P
C104 104
C128 223
C107 223
C146 102
C101 103
C118 1uF/16V
C191 5n
C121 22uF/16V
C190 100n
C103 100n
C192 100uF/16V
C197 M5n6
C198 M5n6
C159 M12n
C188 M12n
C114 0.047
C110 390P
C111 20P
C109 20P
C105 10n
R112 47K
C134 20P
C109 20P
R105 100K
R106 220
R127 15K
R178 22K
R133 270R
R138 100
R139 3.3K
R147 10K
R130 47K
R146 3K3
R148 3K3
R145 3.3M
R128 3K3
R142 2K2
R144 1K
R156 1K
R157 100K
R158 2.2K
R136 2.2K
R141 4.7K
R171 10K
R166 10K
R167 10K
R168 5K6
R169 5K6
R170 1K
R161 180
R162 560R
R163 680
R160 1K5
R164 1K
R159 1K
R165 1K
R102 2.5K
R114 470R
R115 1K8
R116 100
R117 22K
R118 6K8
R113 100R
R119 220R
R143 100
R175 820K
R174 22K
R173 3.3K
R120 5K6
R109 5K6
R126 15K
R127 15K
R178 22K
R134 22K
R135 22K
R140

LAYOUT DIAGRAM - TUNER BOARD (CENELEC)
COMPONENT SIDE



LAYOUT DIAGRAM - TUNER BOARD (CENELEC)
COPPER SIDE



ELECTRICAL PARTSLIST - TUNER BOARD (NON CENENLEC)

- MISCELLANEOUS -

CN102	9965 000 18259	AM ANT TERMINAL 2P
CN105	9965 000 18233	CONN 13P P=1.25 V
J101	9965 000 11365	FM ANTENNA SOCKET

- CAPACITORS -

C142	4822 125 60101	3P0-11P N450 100V
C145	4822 125 60101	3P0-11P N450 100V
C147	9965 000 16264	CER TRIMMER 20P 6.15X5.9
TC102	9965 000 16264	CER TRIMMER 20P 6.15X5.9

- COILS & FILTERS -

CF101	9965 000 18257	FILTER SFE10.7MHZ
CF102	4822 242 80989	SFU450B
CF103	9965 000 18258	FILTER JT10.7MHZ
CF104	9965 000 18257	FILTER SFE10.7MHZ
L101	9965 000 18262	FIXED IND 8MH
L102	9965 000 18262	FIXED IND 8MH
L103	9965 000 18263	IFT 2B
L104	9965 000 18264	SPRING COIL 3.5XDIA5
L105	9965 000 18265	FM BPF DIA2.2X6.5T
L107	9965 000 18266	SPRING COIL 3T5
L108	9965 000 18267	FIXED IND 100μH
L111	9965 000 18268	AM RF IFT 2B/3B
T101	9965 000 18270	AM IFT 2B
X101	9965 000 19728	XTAL 7.2MHZ
	9965 000 19729	FERRITE BEAD 1KΩ 100MHZ

- DIODES -

D101	4822 130 30621	1N4148
D102	4822 130 30621	1N4148
D103	4822 130 70056	1SV101
D104	4822 130 70056	1SV101
D106	4822 130 81673	1SV149
D107	4822 130 30621	1N4148
D108	4822 130 30621	1N4148
D109	4822 130 80317	MTZJ5.1B
VD102	4822 130 81673	1SV149

- IC & TRANSISTORS -

IC101	9965 000 18260	TUNER IC TA2149BN
IC102	9965 000 18261	IC TC9257F
Q101	4822 130 42804	BC817-25
Q102	4822 130 63173	2SK192AY
Q103	9965 000 18269	2SC2714O
Q104	4822 130 42804	BC817-25
Q108	4822 130 42804	BC817-25
Q114	4822 130 42804	BC817-25
Q115	4822 130 42804	BC817-25
Q117	4822 130 40981	BC337-25
Q119	4822 130 42804	BC817-25
Q120	4822 130 42804	BC817-25
Q121	4822 130 42804	BC817-25
Q122	4822 130 42804	BC817-25

Note: Only these parts mentioned in the list are normal service parts.

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ELECTRICAL PARTSLIST - TUNER BOARD (CENENLEC)

- MISCELLANEOUS -

CN102	9965 000 18259	AM ANT TERMINAL 2P
CN105	9965 000 18233	CONN 13P P=1.25
J101	9965 000 11365	FM ANTENNA SOCKET

- CAPACITORS -

C109	9965 000 16264	CER TRIMMER 20P 6.15X5.9
C134	9965 000 16264	CER TRIMMER 20P 6.15X5.9
TC101	9965 000 18314	CER TRIMMER 50P
TC102	9965 000 16264	CER TRIMMER 20P 6.15X5.9

- COILS & FILTERS -

CF103	9965 000 18257	FILTER SFE10.7MHZ
CF104	9965 000 18257	FILTER SFE10.7MHZ
CF105	4822 242 80989	SFU450B
CF106	9965 000 18258	FILTER JT10.7MHZ
L101	9965 000 18268	AM RF IFT 2B/3B
L102	9965 000 18309	LW RF IFT 3B
L103	9965 000 18310	BEADS CORD
L108	9965 000 18267	FIXED IND 100μH
L109	9965 000 18267	FIXED IND 100μH
L110	9965 000 18267	FIXED IND 100μH
L111	9965 000 19758	COIL CB
L112	9965 000 19758	COIL CB
T101	9965 000 18311	LW OSC IFT 3B
T103	9965 000 18312	AM OSC IFT 3B
T105	9965 000 18313	AM IFT 3B
X101	9965 000 19728	XTAL 7.2MHZ
X104	9965 000 19759	XTAL 4.332MHZ

- DIODES -

D101	4822 130 30621	1N4148
D102	4822 130 81673	1SV149
D103	4822 130 30621	1N4148
D104	4822 130 30621	1N4148
D107	4822 130 30621	1N4148
D108	4822 130 81673	1SV149
D109	4822 130 80317	MTZJ5.1B
VD102	4822 130 81673	1SV149

- IC & TRANSISTORS -

IC101	9965 000 18307	TUNER IC TA2099N
IC102	9965 000 18261	IC TC9257F
IC103	9965 000 18308	CHIP IC
IC104	2422 542 90071	FM FRONTEND FE450-G01
Q101	9965 000 18269	2SC2714O
Q102	4822 130 63173	2SK192AY
Q103	4822 130 42804	BC817-25
Q104	4822 130 42804	BC817-25
Q106	4822 130 42804	BC817-25
Q107	4822 130 42804	BC817-25
Q108	4822 130 42804	BC817-25
Q109	4822 130 42804	BC817-25
Q110	4822 130 42804	BC817-25
Q111	4822 130 42804	BC817-25
Q115	4822 130 42804	BC817-25
Q116	9965 000 18269	2SC2714O
Q117	4822 130 40981	BC337-25
Q119	4822 130 42804	BC817-25
Q120	4822 130 42804	BC817-25
Q121	4822 130 42804	BC817-25
Q122	4822 130 42804	BC817-25
Q123	4822 130 42804	BC817-25

Note: Only these parts mentioned in the list are normal service parts.

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MCU & CD BOARD

TABLE OF CONTENTS

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Layout Diagram-Component 8-12
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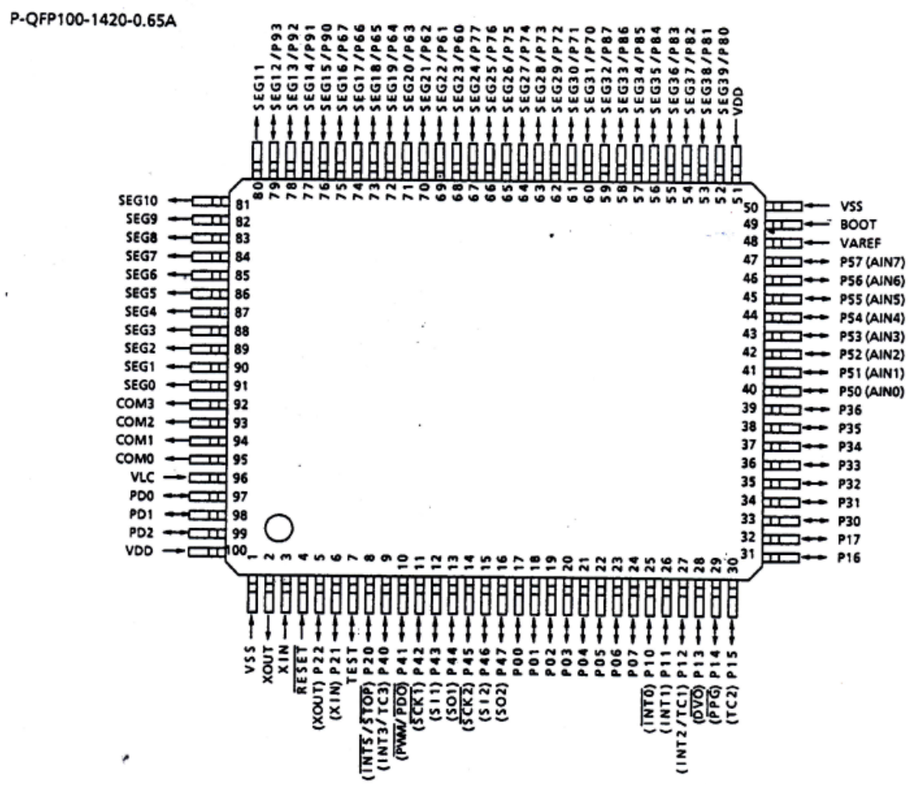
Electrical parts list 8-14

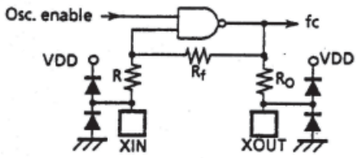
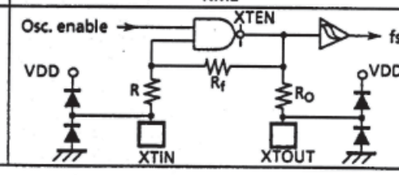
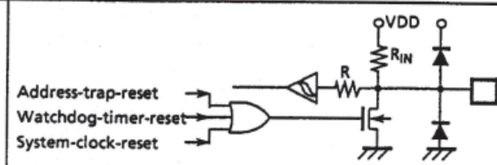
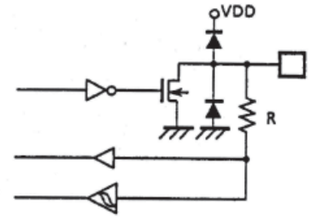
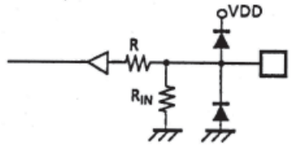
BLOCK DIAGRAM



8-2

MICROPROCESSOR
TMP87EP26F

PINS DESCRIPTION

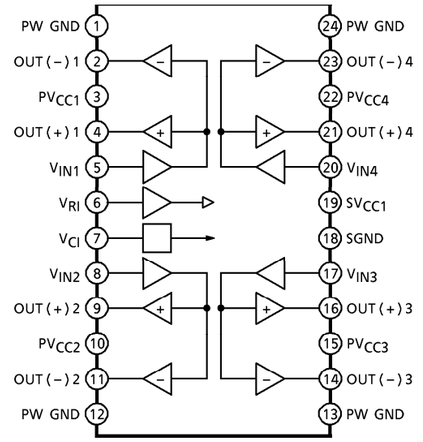
Control Pin	I/O	Input / Output Circuitry and Code	Remarks
XIN XOUT	Input Output		Resonator connecting pins (high-frequency) R_f = 1.2 MΩ (typ.) R_o = 1.5 kΩ (typ.) R = 1 kΩ (typ.)
XTIN XTOUT	Input Output	NM1: Refer to port P2 NM2: 	Resonator connecting pins (low-frequency) R_f = 6 MΩ (typ.) R_o = 220 kΩ (typ.) R = 1 kΩ (typ.)
$\overline{RESET}$	I/O		Sink open drain output Hysteresis input Pull-up resistor R_{IN} = 220 kΩ (typ.) R = 1 kΩ (typ.)
$\overline{STOP}$/$\overline{INT5}$	Input		Hysteresis input R = 1 kΩ (typ.)
TEST BOOT	Input		Pull-down resistor R_{IN} = 70 kΩ (typ.) R = 1 kΩ (typ.)

MICROPROCESSOR
TMP87EP26F

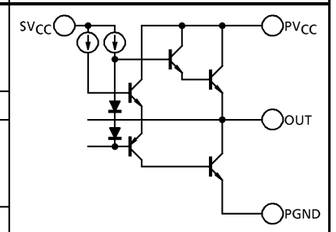
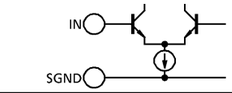
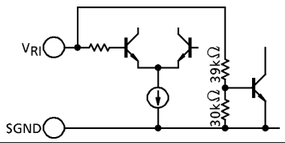
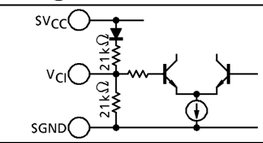
PINS DESCRIPTION

Port	I/O	Input / Output Circuitry and Code	Remarks
P0 P5	I/O	initial "Hi-Z" disable VDD R	Tri-state I/O R = 1 kΩ (typ.)
P1	I/O	initial "Hi-Z" disable VDD R	Tri-state I/O Hysteresis input R = 1 kΩ (typ.)
P3	I/O	initial "Hi-Z" VDD R	Sink open drain output Hysteresis input R = 1 kΩ (typ.)
P2	I/O	initial "Hi-Z" VDD R	Sink open drain output R = 1 kΩ (typ.)
P6 P7 P8 P9	I/O	Segment output disable VDD R	Sink open drain or Segment output R = 1 kΩ (typ.)
P4	I/O	initial "Hi-Z" p-ch Control VDD R	Sink open drain or push-pull output P41 High current output Hysteresis input
PD	I/O	initial "Hi-Z" VDD R	Sink open drain output R = 1 kΩ (typ.)

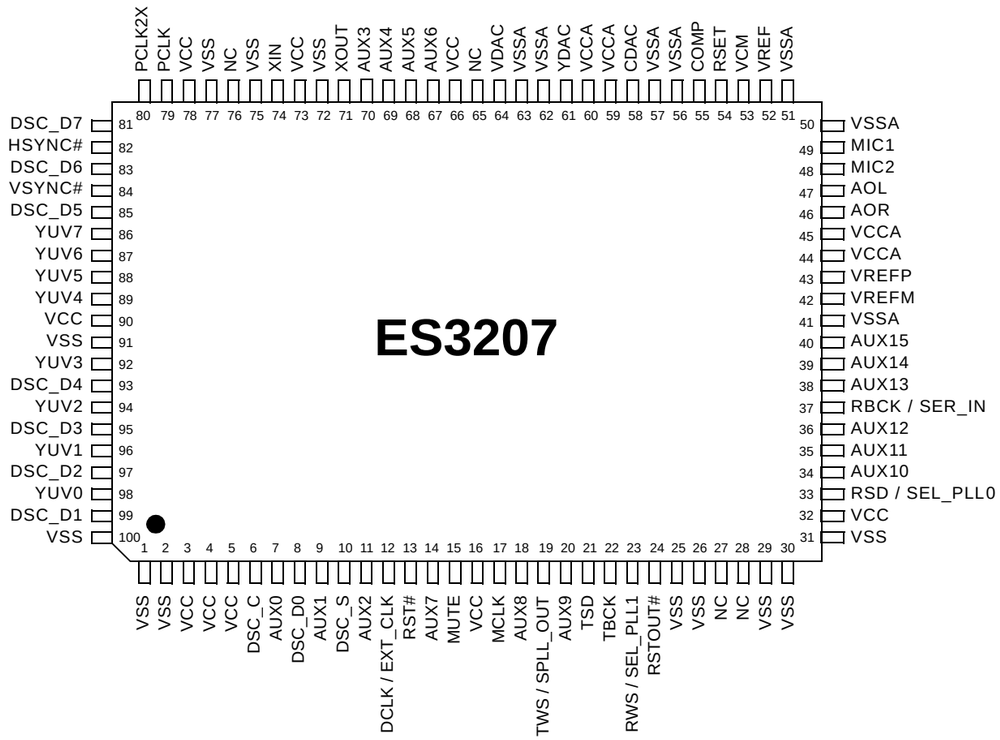
POWER DRIVER IC
TA2092N



TERMINAL EXPLANATION

TERMINAL No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT
1	PW GND	Power GND ● Connected to substrate. ● ①, ⑫, ⑬, ㉔pin are connected inside.	
2	OUT (−) 1	Inverted output for CH1	
3	PV_{CC1}	Supply terminal of output stage for CH1 ● Supply terminal of output stage are not connected to other channel terminal.	
4	OUT (+) 1	Non-inverted output for CH1	
5	V_{IN1}	Input for CH1 ● Not biased inside	
6	V_{RI}	Input reference voltage ● Under condition of $V_{RI} \leqq$ 1.8V, internal bias circuit is shut off. ● No signal input condition : $V_{RI} = V_{IN}$	
7	V_{CI}	Output reference voltage ● $V_{OUT} = V_{CI} = (V_{CC} - V_F) / 2$	
8	V_{IN2}	Input for CH2	Same as channel 1
9	OUT (+) 2	Non-inverted output for CH2	
10	PV_{CC2}	Supply terminal of output stage for CH2	
11	OUT (−) 2	Inverted output for CH2	
12	PW GND	Power GND	
13	PW GND	Power GND	Same as channel 1
14	OUT (−) 3	Inverted output for CH3	
15	PV_{CC3}	Supply terminal of output stage for CH3	
16	OUT (+) 3	Non-inverted output for CH3	
17	V_{IN3}	Input for CH3	
18	S GND	Supply terminal of small signal GND	—
19	S V_{CC}	Small signal GND	—
20	V_{IN4}	Input for CH4	Same as channel 1
21	OUT (+) 4	Non-inverted output for CH4	
22	PV_{CC4}	Supply terminal of output stage for CH4	
23	OUT (−) 4	Inverted output for CH4	
24	PW GND	Power GND	

PINOUT



PIN DESCRIPTION

Name	Number	I/O	Definition
VSS	1:2,25:26,29:31,72,75, 77,91,100	I	Ground.
VCC	3:5,16,32,66,73,78,90	I	Voltage supply, 5 V.
DSC_C	6	I	Clock for programming to access internal registers.
AUX[15:0]	40:38,36:34,20,18,14, 67:70,11,9,7	I/O	Auxiliary control pins.
DSC_D[7:0]	81,83,85,93,95,97,99,8	I/O	Data for programming to access internal registers.
DSC_S	10	I	Strobe for programming to access internal registers.
DCLK EXT_CLK	12	O	Dual-purpose pin. DCLK is the MPEG decoder clock.
		I	EXT_CLK is the external clock. EXT_CLK is an input during bypass PLL mode.
RST#	13	I	Video reset (active-low).
MUTE	15	O	Audio mute.
MCLK	17	I	Audio master clock.
TWS SPLL_OUT	19	I	Dual-purpose pin. TWS is the transmit audio frame sync.
		O	SPLL_OUT is the select PLL output.

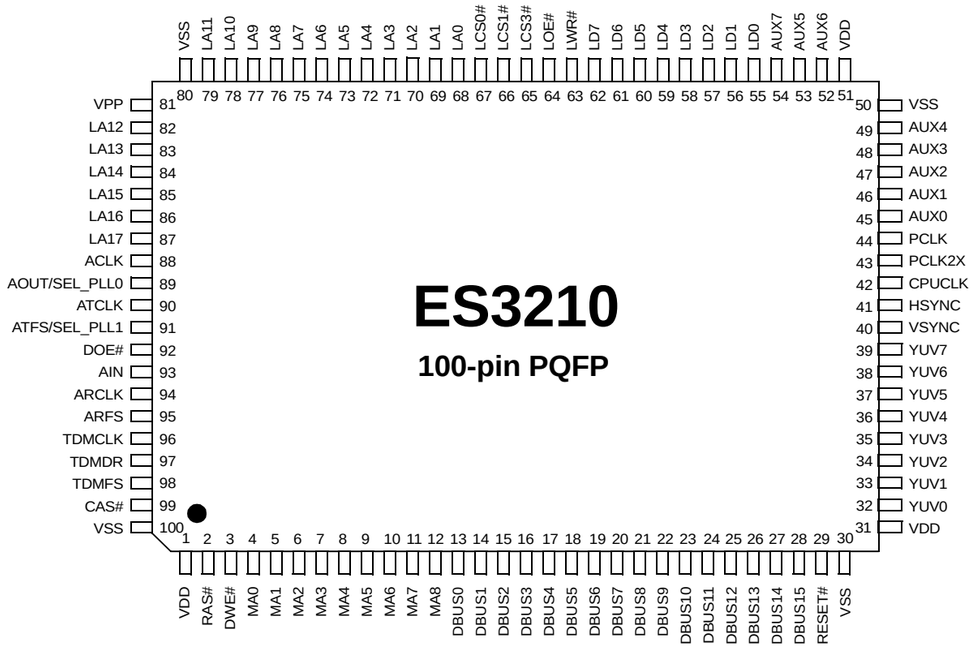
8-4

VIDEO CD/DVD COMPANION PROCESSOR
ES3207

PIN DESCRIPTION

Name	Number	I/O	Definition
TSD	21	I	Transmit audio data input.
TBCK	22	I	Transmit audio bit clock.
RWS	23	O	Dual-purpose pin. RWS is the receive audio frame sync.
SEL_PLL1		I	Pins SEL_PLL[1:0] select the PLL clock frequency for the DCLK output. SEL_PLL1 / SEL_PLL0 / DCLK 0 / 0 / Bypass PLL (input mode) 0 / 1 / 27 MHz (output mode) 1 / 0 / 32.4 MHz (output mode) 1 / 1 / 40.5 MHz (output mode)
RSTOUT#	24	O	Reset output (active-low).
NC	27:28,65:76		No connect. Do not connect to these pins.
RSD	33	O	Dual-purpose pin. RSD is the receive audio data input.
SEL_PLL0		I	SEL_PLL0 along with SEL_PLL1 select the PLL clock frequency for the DCLK output. See the table for pin number 23.
RBCK	37	O	Dual-purpose pin. RBCK is the receive audio bit clock.
SER_IN		I	SER_IN is the serial input DSC mode. 0 = Parallel DSC mode. 1 = Serial DSC mode.
VSSA	41,50:51,56:57,62:63	I	Analog ground.
VREFM	42	I	DAC and ADC minimum reference. Bypass to VCMR with 10 mF in parallel with 0.1 mF.
VREFP	43	I	DAC and ADC maximum reference. Bypass to VCMR with 10 mF in parallel with 0.1 mF.
VCCA	44:45,59:60	I	Analog VCC, 5 V.
AOR	46	O	Right channel output.
AOL	47	O	Left channel output.
MIC2	48	I	Microphone input 2.
MIC1	49	I	Microphone input 1.
VREF	52	I	Internal resistor divider generates Common Mode Reference (CMR) voltage. Bypass to analog ground with 0.1 mF.
VCM	53	I	ADC Common Mode Reference (CMR) buffer output. CMR is approximately 2.25 V. Bypass to analog ground with 47 mF electrolytic in parallel with 0.1 mF.
RSET	54	I	Full scale DAC current adjustment.
COMP	55	I	Compensation pin.
CDAC	58	O	Modulated chrominance output.
YDAC	61	O	Y luminance data bus for screen video port.
VDAC	64	O	Composite video output.
XOUT	71	O	Crystal output.
XIN	74	I	27 MHz crystal input.
PCLK	79	I/O	13.5 MHz pixel clock.
PCLK2X	80	I/O	27 MHz (2 times pixel clock).
HSYNC#	82	O	Horizontal sync (active-low).
VSYNC#	84	O	Vertical sync (active-low).
YUV[7:0]	86:89,92,94,96,98	I	YUV data bus for screen video port.

ES3210 PINOUT


ES3210
100-pin PQFP
VSS 100
CAS# 99
TDMFS 98
TDMDR 97
TDMCLK 96
ARFS 95
ARCLK 94
AIN 93
DOE# 92
ATFS/SEL_PLL1 91
AOUT/SEL_PLL0 89
ACLK 88
LA17 87
LA16 86
LA15 85
LA14 84
LA13 83
LA12 82
VPP 81
VDD 31
YUV0 32
YUV1 33
YUV2 34
YUV3 35
YUV4 36
YUV5 37
YUV6 38
YUV7 39
VSYNC 40
HSYNC 41
CPUCLK 42
PCLK2X 43
PCLK 44
AUX0 45
AUX1 46
AUX2 47
AUX3 48
AUX4 49
VSS 50
VDD 51 52 AUX6 53 AUX5 54 AUX7 55 LD0 56 LD1 57 LD2 58 LD3 59 LD4 60 LD5 61 LD6 62 LD7 63 LWR# 64 LOE# 65 LCS3# 66 LCS1# 67 LCS0# 68 LA0 69 LA1 70 LA2 71 LA3 72 LA4 73 LA5 74 LA6 75 LA7 76 LA8 77 LA9 78 LA10 79 LA11 80 VSS
VDD 1 RAS# 2 DWE# 3 MA0 4 MA1 5 MA2 6 MA3 7 MA4 8 MA5 9 MA6 10 MA7 11 MA8 12 DBUS0 13 DBUS1 14 DBUS2 15 DBUS3 16 DBUS4 17 DBUS5 18 DBUS6 19 DBUS7 20 DBUS8 21 DBUS9 22 DBUS10 23 DBUS11 24 DBUS12 25 DBUS13 26 DBUS14 27 DBUS15 28 RESET# 29 VSS 30

ES3210 PIN DESCRIPTION

Name	Number	I/O	Definition
VDD	1, 31, 51	I	Voltage supply for 3.3V.
RAS#	2	O	DRAM row address strobe (active low).
DWE#	3	O	DRAM write enable (active low).
MA[8:0]	12:4	O	DRAM multiplexed row and column address bus.
DBUS[15:0]	28:13	I/O	DRAM data bus I/O [15:0].
RESET#	29	I	System reset (active low).
VSS	30, 50, 80, 100	I	Ground.
YUV[7:0]	39:32	O	YUV[7:0] pixel output data.
VSYNC	40	I/O	Vertical sync for screen video interface, programmable for rising or falling edge.
HSYNC	41	I/O	Horizontal sync for screen video interface, programmable for rising or falling edge.
CPUCLK	42	I	RISC and system clock input. CPUCLK is used only if SEL_PLL[1:0] = 00.
PCLK2X	43	I/O	Pixel clock; two times the actual pixel clock for screen video interface.

8-5

VIDEO CD PROCESSOR
ES3210

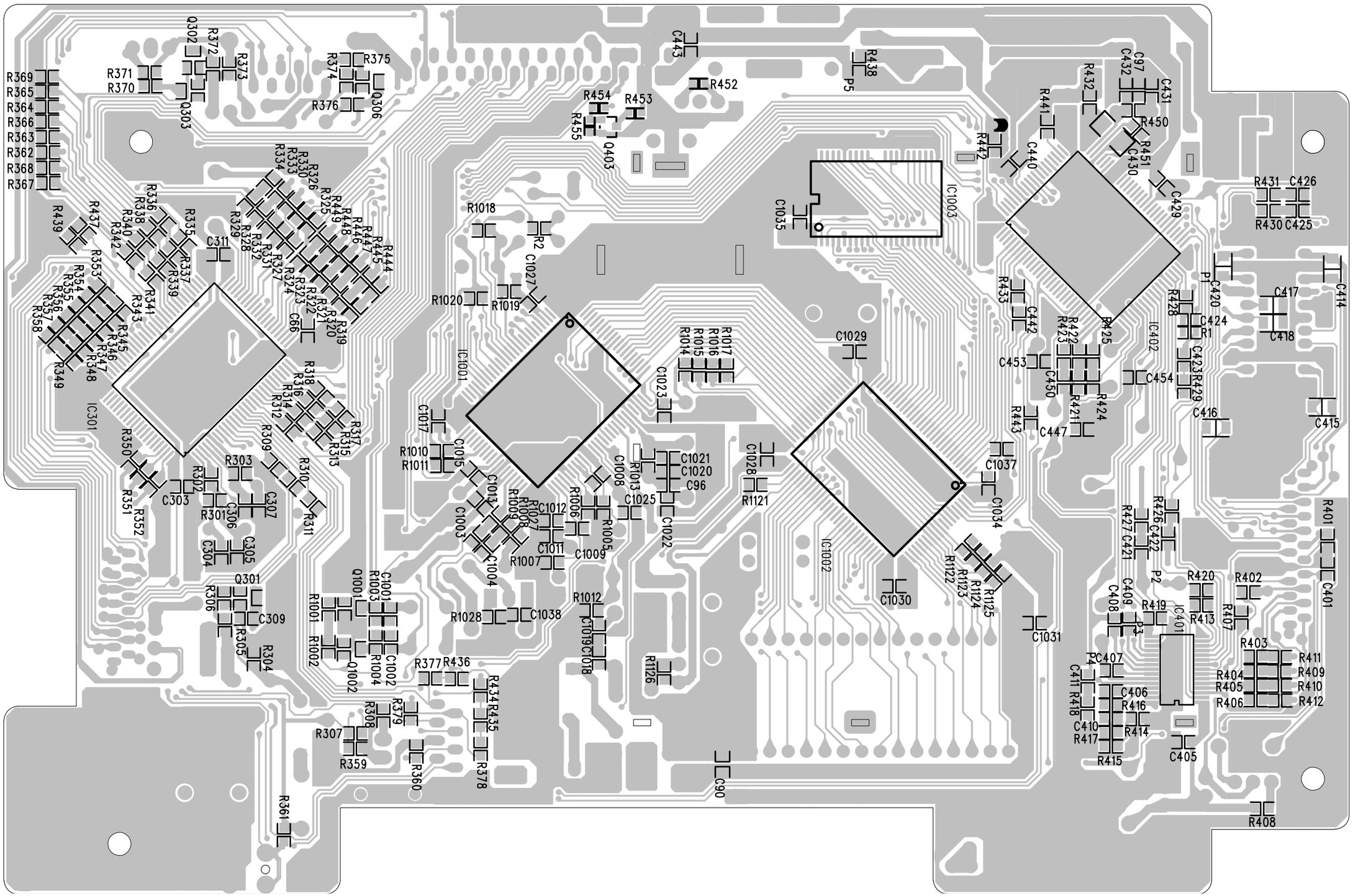
PIN DESCRIPTION (Continued)

Name	Number	I/O	Definition
PCLK	44	I/O	Pixel clock qualifier in for screen video interface.
AUX[7:0]	54:52, 49:45	I/O	Auxiliary control pins (AUX0 and AUX1 are open collectors).
LD[7:0]	62:55	I/O	RISC interface data bus.
LWR#	63	O	RISC interface write enable (active low).
LOE#	64	O	RISC interface output enable (active low).
LCS[3,1,0]#	65:67	O	RISC interface chip select (active low).
LA[17:0]	87:82, 79:68	O	RISC interface address bus.
VPP	81	I	Digital supply voltage for 5V.
ACLK	88	I/O	Master clock for external audio DAC (8.192 MHz, 11.2896 MHz, 12.288 MHz, 16.9344 MHz, and 18.432 MHz).
AOUT/	89	O	Dual-purpose pin. AOUT is the audio interface serial data output
SEL_PLL0		I	Select PLL[0] input. The matrix below lists the available clock frequencies and their respective PLL bit settings.
ATCLK	90	I/O	Audio transmit bit clock.
ATFS	91	O	Audio transmit frame sync.
SEL_PLL1		I	Refer to the description and matrix for SEL_PLL0 pin 89.
DOE#	92	O	DRAM output enable (active low).
AIN	93	I	Audio serial data input.
ARCLK	94	I	Audio receive bit clock.
ARFS	95	I	Audio receive frame sync.
TDMCLK	96	I	TDM interface serial clock.
TDMDR	97	I	TDM interface serial data receive.
TDMFS	98	I	TDM interface frame sync.
CAS#	99	O	DRAM column address strobe bank 0 (active low).

SEL_PLL1	SEL_PLL0	Clock Output
0	0	Bypass PLL
0	1	54.0 MHz
1	0	67.5 MHz
1	1	81.0 MHz

8-13

LAYOUT DIAGRAM - MCU & CD BOARD
SMD SIDE

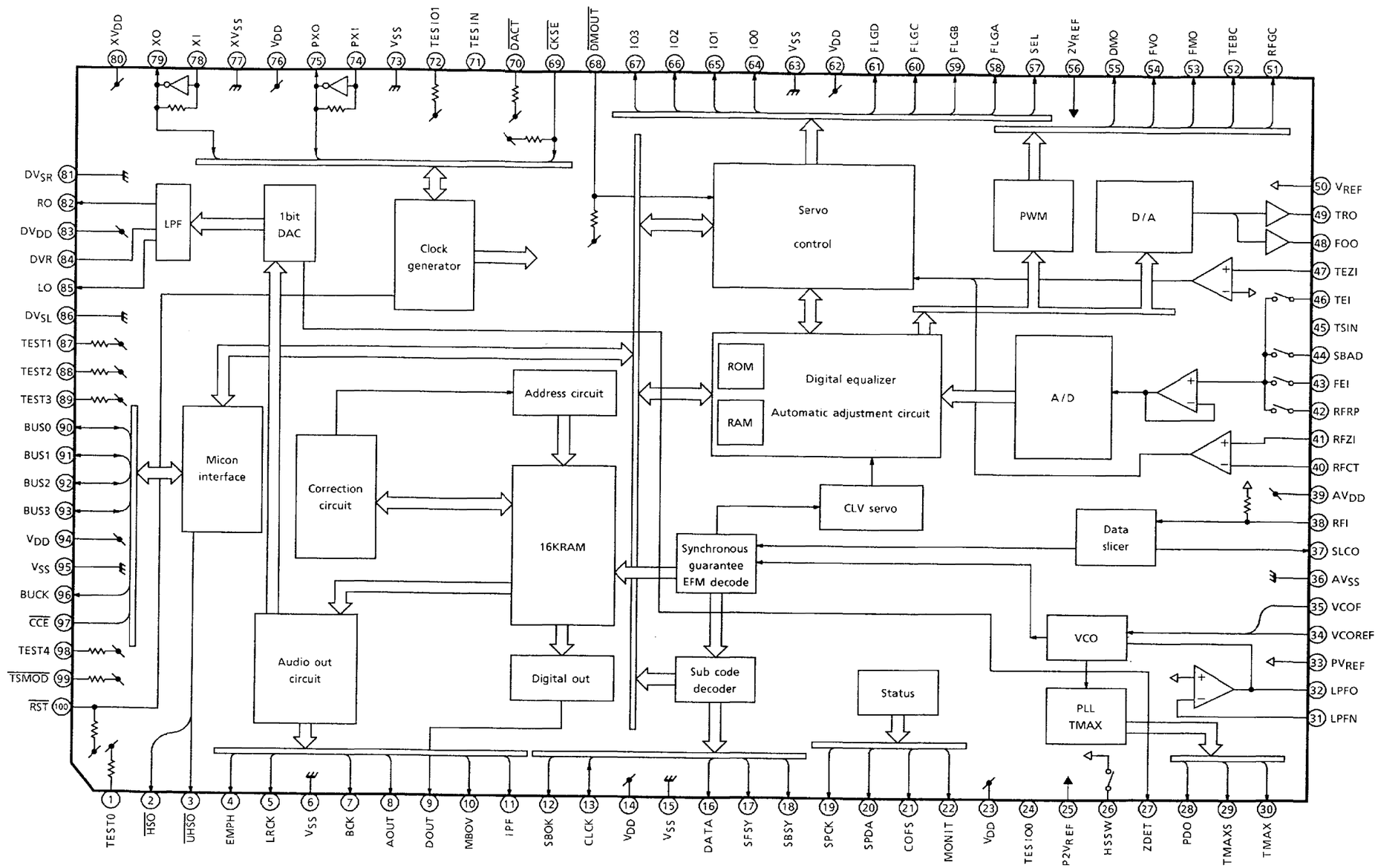


8-6

DIGITAL SERVO PROCESSOR
TC9462F

BLOCK DIAGRAM

BLOCK DIAGRAM (Top view)



PINS DESCRIPTION

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
1	TEST0	I	Test mode terminal. Normally, keep at open.	With pull-up resistor.
2	$\overline{HSO}$	O	Playback speed mode flag output terminal. $\overline{UHSO}$ / $\overline{HSO}$ / PLAYBACK SPEED H / H / Normal H / L / 2 times L / H / 4 times L / L / —	—
3	$\overline{UHSO}$	O		
4	EMPH	O	Subcode Q data emphasis flag output terminal. Emphasis ON at "H" level and OFF at "L" level. The output polarity can invert by command.	—
5	LRCK	O	Channel clock output terminal. (44.1 kHz) L-ch at "L" level and R-ch at "H" level. The output polarity can invert by command.	—
6	V_{SS}	—	Digital GND terminal.	—
7	BCK	O	Bit clock output terminal. (1.4112 MHz)	—
8	AOUT	O	Audio data output terminal.	—
9	DOUT	O	Digital data output terminal.	—
10	MBOV	O	Buffer memory over signal output terminal. Over at "H" level.	—
11	IPF	O	Correction flag output terminal. At "H" level, AOUT output is made to correction impossibility by C_2 correction processing.	—
12	SBOK	O	Subcode Q data CRCC check adjusting result output terminal. The adjusting result is OK at "H" level.	—
13	CLCK	I/O	Subcode P~W data readout clock input/output terminal. This terminal can select by command bit.	—
14	V_{DD}	—	Digital power supply voltage terminal.	—
15	V_{SS}	—	Digital GND terminal.	—
16	DATA	O	Subcode P~W data output terminal.	—
17	SFSY	O	Play-back frame sync signal output terminal.	—
18	SBSY	O	Subcode block sync signal output terminal.	—
19	SPCK	O	Processor status signal readout clock output terminal.	—
20	SPDA	O	Processor status signal output terminal.	—
21	COFS	O	Correction frame clock output terminal. (7.35 kHz)	—
22	MONIT	O	Internal signal (DSP internal flag and PLL clock) output terminal. Selected by command. This terminal output the text data with serial by command.	—

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DIGITAL SERVO PROCESSOR
TC9462F

PINS DESCRIPTION

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
23	V_{DD}	—	Digital power supply voltage terminal.	—
24	TESIO0	I	Test input/output terminal. Normally, keep at "L" level. The terminal that inputted the clock for read of text data by command.	—
25	$P2V_{REF}$	—	PLL double reference voltage supply terminal.	—
26	HSSW	O	2/4 times speed at "V_{REF}" voltage.	2-state output. (PV_{REF}, HiZ)
27	ZDET	O	1 bit DA converter zero detect flag output terminal.	—
28	PDO	O	Phase difference signal output terminal of EFM signal and PLCK signal.	3-state output. ($P2V_{REF}$, PV_{REF}, V_{SS})
29	TMAXS	O	TMAX detection result output terminal. Selected by command bit (TMPS).	3-state output. ($P2V_{REF}$, PV_{REF}, V_{SS})
30	TMAX	O	TMAX detection result output terminal. Selected by command bit (TMPS). DIFFERENCE RESULT / TMAX OUTPUT Longer than fixed freq. / "$P2V_{REF}$" Shorter than fixed freq. / "V_{SS}" Within the fixed freq. / "HiZ"	3-state output. ($P2V_{REF}$, HiZ, V_{SS})
31	LPFN	I	LPF amplifier inverting input terminal for PLL.	Analog input.
32	LPFO	O	LPF amplifier output terminal for PLL.	Analog output.
33	PV_{REF}	—	PLL reference voltage supply terminal.	—
34	VCOREF	I	VCO center frequency reference level terminal. Normally, keep at "PV_{REF}" level.	—
35	VCOF	O	VCO filter terminal.	Analog output.
36	AV_{SS}	—	Analog GND terminal.	—
37	SLCO	O	Data slice level output terminal.	Analog output.
38	RFI	I	RF signal input terminal.	Analog input. (Z_{in} : selected by command)
39	AV_{DD}	—	Analog power supply voltage terminal.	—
40	RFCT	I	RFRP signal center level input terminal.	Analog input. (Z_{in} : 50 kΩ)
41	RFZI	I	RFRP zero cross input terminal.	Analog input.
42	RFRP	I	RF ripple signal input terminal.	Analog input.
43	FEI	I	Focus error signal input terminal.	Analog input.
44	SBAD	I	Sub-beam adder signal input terminal.	Analog input.
45	TSIN	I	Test input terminal. Normally, keep at "V_{REF}" level.	Analog input.
46	TEI	I	Tracking error signal input terminal. Take in at tracking servo on.	Analog input.
47	TEZI	I	Tracking error zero cross input terminal.	Analog input. (Z_{in} : 10 kΩ)

DIGITAL SERVO PROCESSOR
TC9462F

PINS DESCRIPTION

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
48	FOO	O	Focus servo equalizer output terminal.	Analog output. ($2V_{REF}$~AV_{SS})
49	TRO	O	Tracking servo equalizer output terminal.	
50	V_{REF}	—	Analog reference voltage supply terminal.	—
51	RFGC	O	RF amplitude adjustment control signal output terminal.	3-state PWM signal output. ($2V_{REF}$, V_{REF}, V_{SS}) (PWM carrier = 88.2 kHz)
52	TEBC	O	Tracking balance control signal output terminal.	
53	TEBC	O	Feed equalizer output terminal.	
54	TEBC	O	Speed error signal or feed search equalizer output terminal.	
55	DMO	O	Disk equalizer output terminal. (PWM carrier = 88.2 kHz for DSP, Synchronize to PXO)	3-state output. ($2V_{REF}$, V_{REF}, V_{SS})
56	$2V_{REF}$	—	Analog double reference voltage supply terminal.	—
57	SEL	O	APC circuit ON/OFF indication signal output terminal. At the laser on time, UHF = L at "HiZ" level and UHF = H at "H" level.	—
58	FLGA	O	Extemal flag output terminal for internal signal. Can select signal from TEZC, $\overline{FOON}$, $\overline{FOK}$ and RFZC by command.	—
59	FLGB	O	Extemal flag output terminal for internal signal. Can select signal from $\overline{DFCT}$, $\overline{FOON}$, $\overline{FMON}$ and RFZC by command.	—
60	FLGC	O	Extemal flag output terminal for internal signal. Can select signal from $\overline{TRON}$, $\overline{TRSR}$, $\overline{FOK}$ and $\overline{SRCH}$ by command.	—
61	FLGD	O	Extemal flag output terminal for internal signal. Can select signal from $\overline{TRON}$, $\overline{DMON}$, $\overline{HYS}$ and $\overline{SHC}$ by command.	—
62	V_{DD}	—	Digital power supply voltage terminal.	—
63	V_{SS}	—	Digital GND terminal.	—
64	IO0	I/O	General I/O terminal. Can change over input port or output port by command. At the input mode time can readout a state of terminal (H/L) by read command. At the output mode time can control a state of terminal (H/L/HiZ) by command.	—
65	IO1			
66	IO2			
67	IO3			
68	$\overline{DMOUT}$	I	This terminal controls IO0~IO3 terminal. At "L" level time, IO0, 1 out feed equalizer signal of 2-state PWM, IO2, 3 out disk equalizer signal of 2-state PWM.	With pull-up resistor.
69	$\overline{CKSE}$	I	Normally, keep at open.	With pull-up resistor.
70	$\overline{DACT}$	I	DAC test mode terminal. Normally, keep at open.	With pull-up resistor.
71	TESIN	I	Test input terminal. Normally, keep at "L" level.	Analog input.

8-8

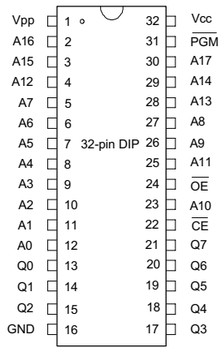
DIGITAL SERVO PROCESSOR
TC9462F

PINS DESCRIPTION

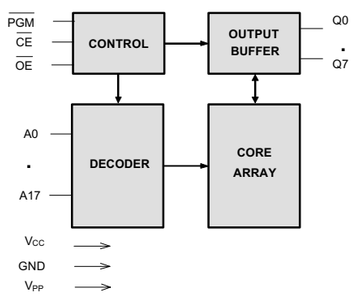
PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
72	TESIO1	I	Test input/output terminal. Normally, keep at "L" level.	Analog input.
73	V_{SS}	—	Digital GND terminal.	—
74	PXI	I	Crystal oscillator connecting input terminal for DSP. Normally, keep at "L" level.	—
75	PXO	O	Crystal oscillator connecting output terminal for DSP.	
76	V_{DD}	—	Digital power supply voltage terminal.	—
77	XV_{SS}	—	Oscillator GND terminal for system clock.	—
78	XI	I	Crystal oscillator connecting input terminal for system clock.	—
79	XO	O	Crystal oscillator connecting output terminal for system clock.	—
80	XV_{DD}	—	Oscillator power supply voltage terminal for system clock.	—
81	DV_{SR}	—	Analog GND terminal for DA converter. (R-ch)	—
82	RO	O	R channel data forward output terminal.	—
83	DV_{DD}	—	Analog supply voltage terminal for DA converter.	—
84	DVR	—	Reference voltage terminal for DA converter.	—
85	LO	O	L channel data forward output terminal.	—
86	DV_{SL}	—	Analog GND terminal for DA converter. (L-ch)	—
87	TEST1	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
88	TEST2	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
89	TEST3	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
90	BUS0	I/O	Micon interface data input/output terminal.	Schmit input. With pull-up resistor.
91	BUS1	I/O		
92	BUS2	I/O		
93	BUS3	I/O		
94	V_{DD}	—	Digital power supply voltage terminal.	—
95	V_{SS}	—	Digital GND terminal.	—
96	BUCK	I	Micon interface clock input terminal.	Schmit input.
97	$\overline{CCE}$	I	Command and data sending/receiving chip enable signal input terminal. The bus line becomes active at "L" level.	Schmit input.
98	TEST4	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
99	$\overline{TSMOD}$	I	Local test mode selection terminal.	With pull-up resistor.
100	$\overline{RST}$	I	Reset signal input terminal. Reset at "L" level.	With pull-up resistor.

E2PROM
W27C020

PIN CONFIGURATIONS



BLOCK DIAGRAM

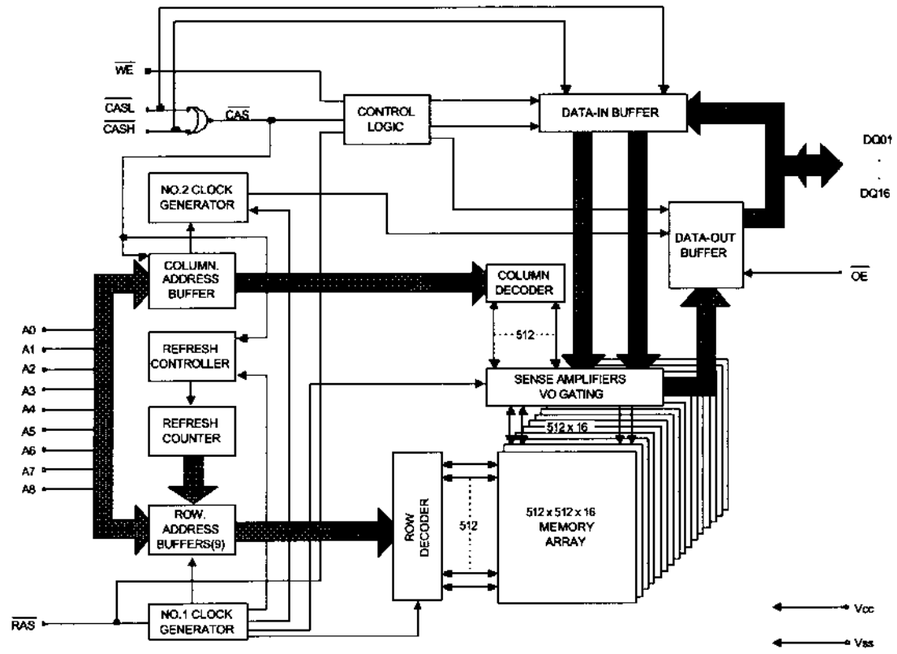


PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0–A17	Address Inputs
Q0–Q7	Data Inputs/Outputs
$\overline{CE}$	Chip Enable
$\overline{OE}$	Output Enable
$\overline{PGM}$	Program Enable
VPP	Program/Erase Supply Voltage
VCC	Power Supply
GND	Ground

DRAM
T224162B28S

FUNCTIONAL BLOCK DIAGRAM



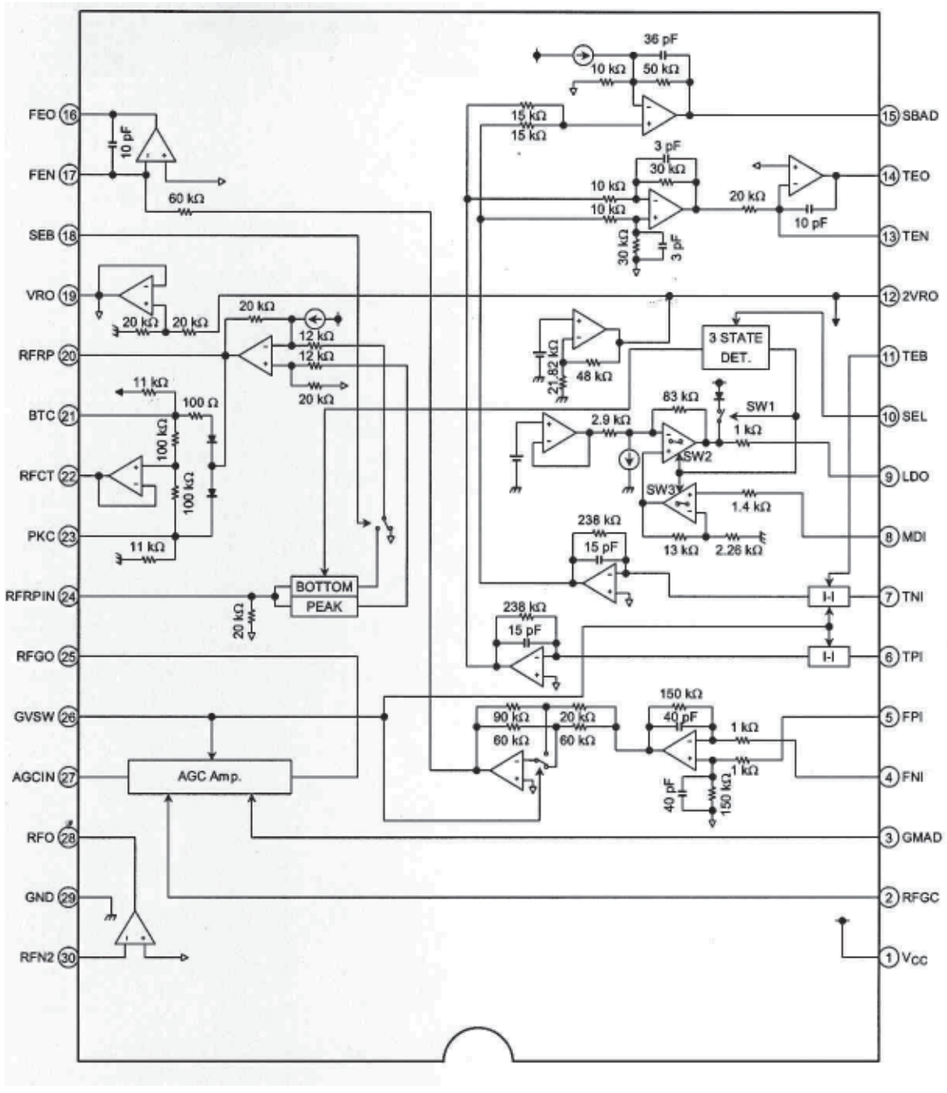
PIN DESCRIPTIONS

PIN NO.	SYM.	TYPE	DESCRIPTION
16~19,22~26	A0-A8	Input	Address Input
14	$\overline{RAS}$	Input	Row Address Strobe
28	$\overline{CASH}$	Input	Column Address Strobe /Upper Byte Control
29	$\overline{CASL}$	Input	Column Address Strobe /Lower Byte Control
13	$\overline{WE}$	Input	Write Enable
27	$\overline{OE}$	Input	Output Enable
2~5,6~10,31~34,36~39	I/O1 - I/O16	Input/ Output	Data Input/ Output
1,6,20	Vcc	Supply	Power, 5V
21,35,40	Vss	Ground	Ground
11,12,15,30	NC	-	No Connect

8-10

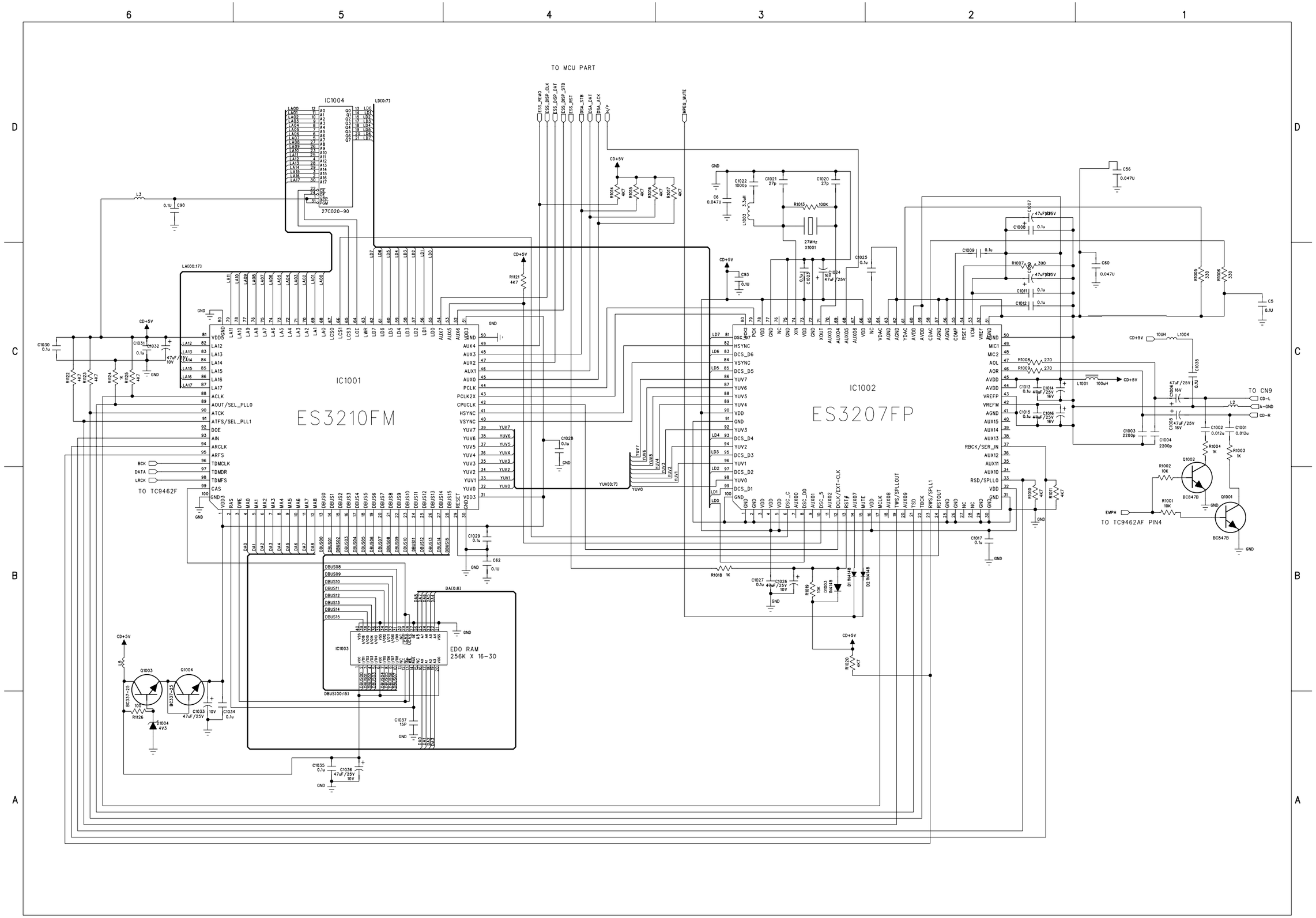
MICROPROCESSOR
TA2153FN

BLOCK DIAGRAM



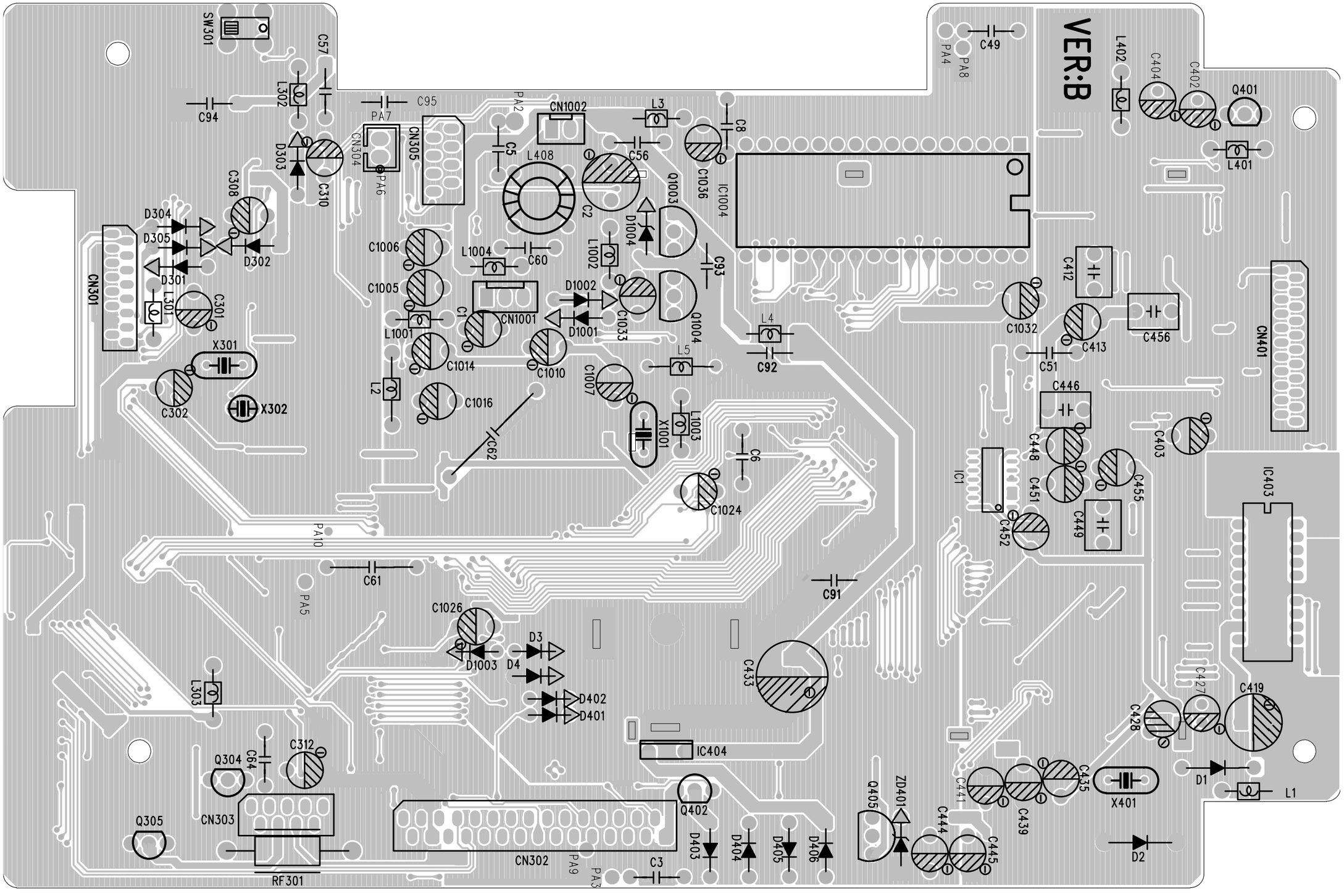
8-11

CIRCUIT DIAGRAM - MCU & CD BOARD



8-12

LAYOUT DIAGRAM - MCU & CD BOARD
COMPONENT SIDE



8-14

ELECTRICAL PARTSLIST - CD MCU BOARD

- MISCELLANEOUS -

CN301	9965 000 18230	CONN 16P H P=1.0
CN302	9965 000 18232	CONN 30P P=1.25 V
CN303	9965 000 18273	CONN 9P
CN401	9965 000 18274	CONN 22P
PA7	9965 000 14709	TERMINAL PIN
SW301	9965 000 18285	SWITCH SIDE SPVF130100

- RESISTORS -

RF301	⚠	9965 000 14537	1/2W 1Ω

- COILS & FILTERS -

L1001	9965 000 19740	FIXED IND 100μH TP=52MM
L1002	9965 000 19760	FIXED IND 2.4μH (K)
L1003	9965 000 19761	FIXED IND 3.3μH CECS
L1004	9965 000 19762	FIXED IND 10μH
L2	9965 000 14721	FILTER EMI BL01 RN1
L3	9965 000 14721	FILTER EMI BL01 RN1
L301	9965 000 19740	FIXED IND 100μH TP=52MM
L302	9965 000 19740	FIXED IND 100μH TP=52MM
L303	9965 000 19740	FIXED IND 100μH TP=52MM
L4	9965 000 14721	FILTER EMI BL01 RN1
L401	9965 000 19762	FIXED IND 10μH
L402	9965 000 19763	FIXED IND 47μH (K) T26
L5	9965 000 14721	FILTER EMI BL01 RN1
X1001	9965 000 19764	XTAL 27MHZ
X301	9965 000 18282	CRYSTAL 7.3728 MHZ
X302	9965 000 18283	CRYSTAL 32.768KHZ
X401	9965 000 19766	XTAL 16.93MHZ

- DIODES -

D1	4822 130 31878	1N4003G
D1001	4822 130 30621	1N4148
D1002	4822 130 30621	1N4148
D1003	4822 130 30621	1N4148
D1004	4822 130 31554	BZX79-B4V3
D2	4822 130 31878	1N4003G
D3	4822 130 30621	1N4148
D301	4822 130 30621	1N4148
D302	4822 130 30621	1N4148
D303	4822 130 30621	1N4148
D305	4822 130 30621	1N4148
D4	4822 130 30621	1N4148
D401	4822 130 30621	1N4148
D402	4822 130 30621	1N4148
D403	4822 130 83883	FR202
D404	4822 130 83883	FR202
D405	4822 130 83883	FR202

- DIODES -

D406	4822 130 83883	FR202
ZD401	4822 130 83206	BZX79-B5V6

- IC & TRANSISTORS -

IC1001	9965 000 19731	IC ES320TFP
IC1002	9965 000 19732	IC ES3210FM
IC1003	9965 000 19734	IC T224162B-28S
IC1004	9965 000 14729	E2PROM W27C020
IC301	9965 000 18275	IC MCU TMP87EP26F4K76
IC401	9322 171 88668	IC SM TA2153FN
IC402	9965 000 18276	IC TC9462F
IC403	9965 000 18277	IC TA2092N
IC404	4822 209 80817	L7805CV
Q1001	5322 130 60159	BC846B
Q1002	5322 130 60159	BC846B
Q1003	4822 130 40981	BC337-25
Q1004	4822 130 40981	BC337-25
Q301	5322 130 60159	BC846B
Q302	5322 130 60159	BC846B
Q303	5322 130 60159	BC846B
Q304	5322 130 44593	BC369
Q305	5322 130 44593	BC369
Q306	4822 130 60373	BC856B
Q401	4822 130 44568	BC557B
Q402	5322 130 44593	BC369
Q403	5322 130 60159	BC846B
Q405	4822 130 40981	BC337-25

Note: Only these parts mentioned in the list are normal service parts.

DIODE & CONNECTION BOARDS

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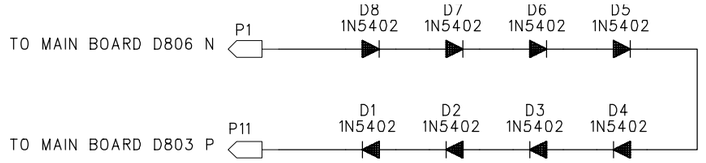
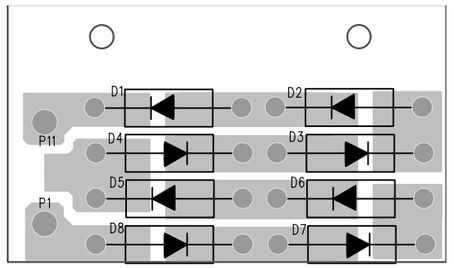
9-1

DIODE PCB CIRCUIT DIAGRAM

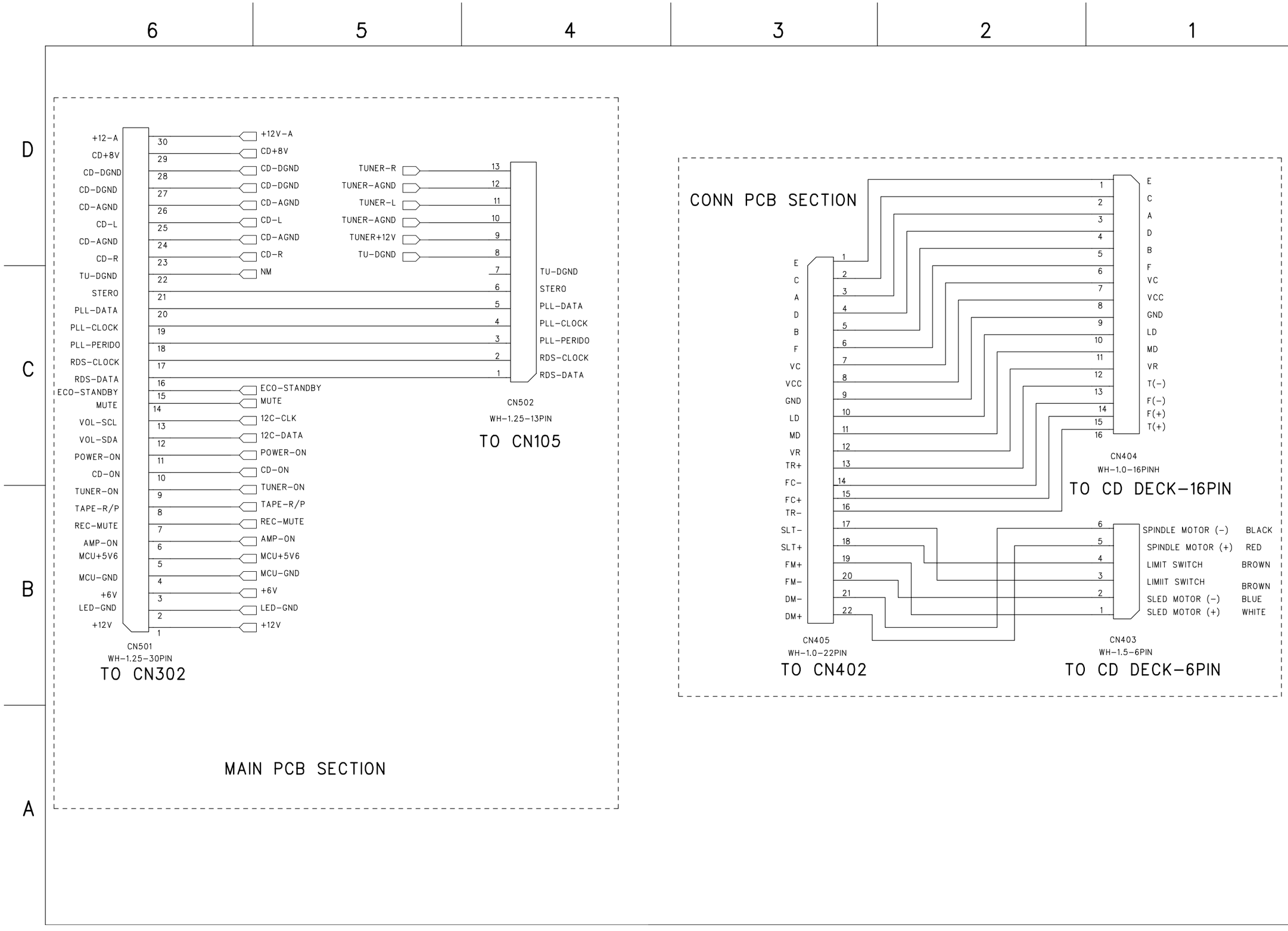


DIODE PCB LAYOUT DIAGRAM



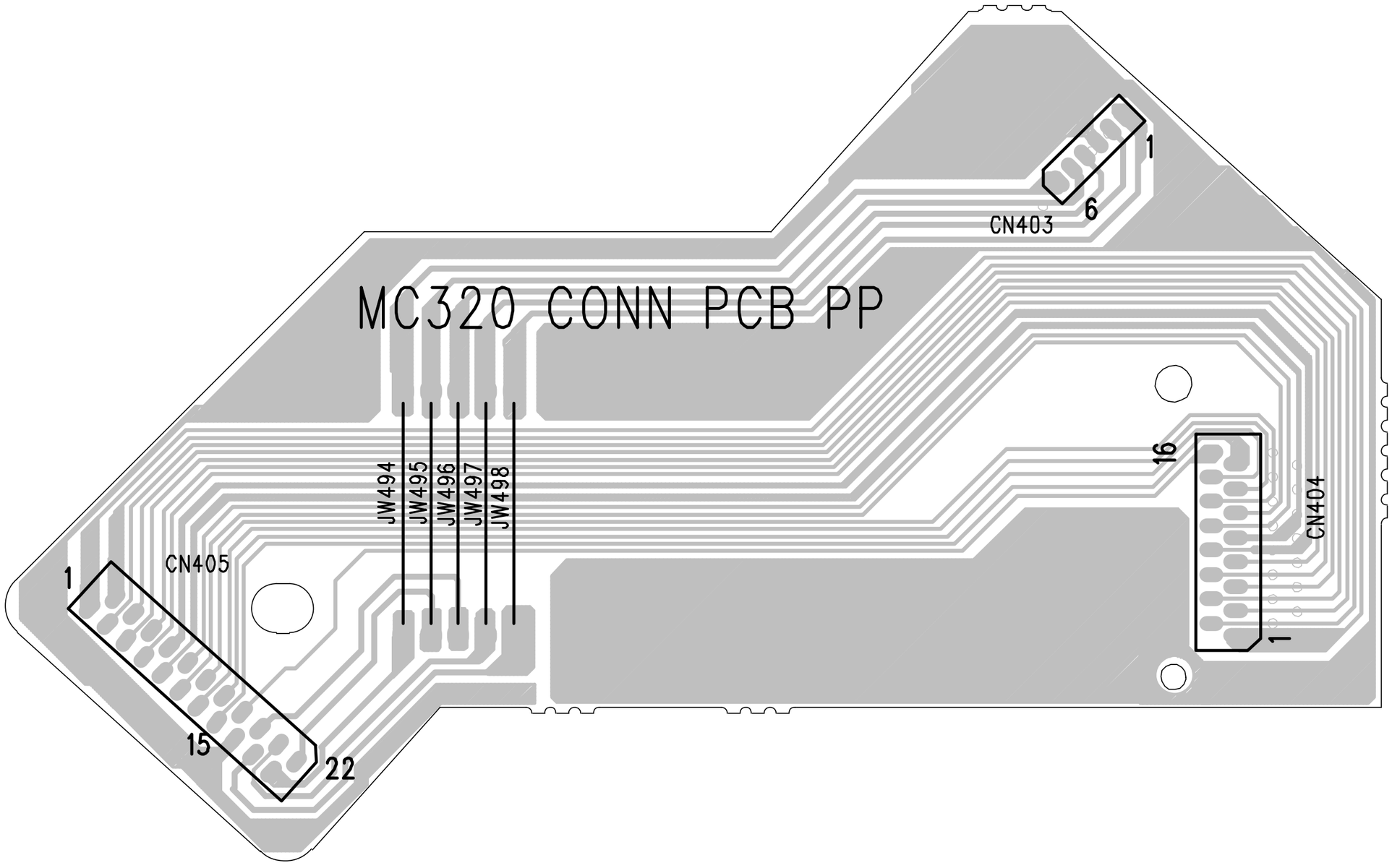
9-2

CONNECTION PCB CIRCUIT DIAGRAM



9-3

CONNECTION PCB LAYOUT DIAGRAM



ELECTRICAL PARTSLIST - DIODE BOARD

- DIODES -

D1	9965 000 19770	DIODE 1N5402GW F20
D2	9965 000 19770	DIODE 1N5402GW F20
D3	9965 000 19770	DIODE 1N5402GW F20
D4	9965 000 19770	DIODE 1N5402GW F20
D5	9965 000 19770	DIODE 1N5402GW F20
D6	9965 000 19770	DIODE 1N5402GW F20
D7	9965 000 19770	DIODE 1N5402GW F20
D8	9965 000 19770	DIODE 1N5402GW F20

Note: Only these parts mentioned in the list are normal service parts.

9-4

ELECTRICAL PARTSLIST - CONNECTION BOARD

- MISCELLANEOUS -

CN403	9965 000 18229	CONN P=1.5 H 6PIN
CN404	9965 000 18230	CONN 16P H P=1.0
CN405	9965 000 18231	CONN 22P P=1.0 H

Note: Only these parts mentioned in the list are normal service parts.

10-1

MAIN BOARD

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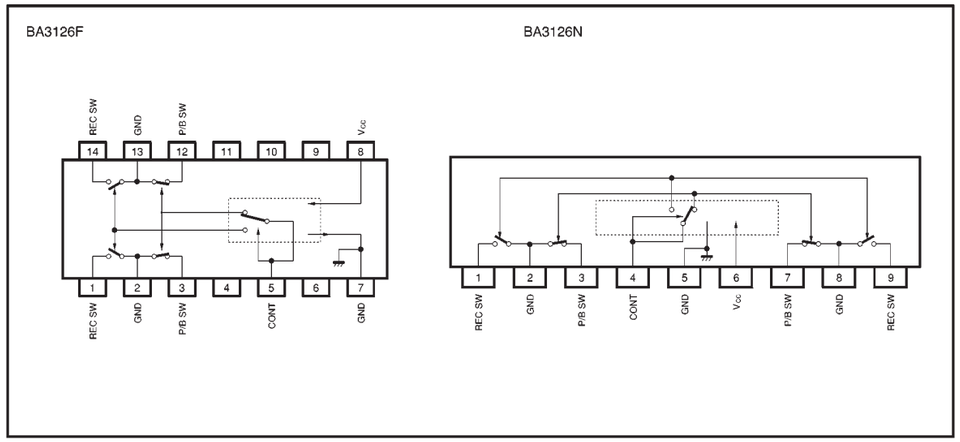
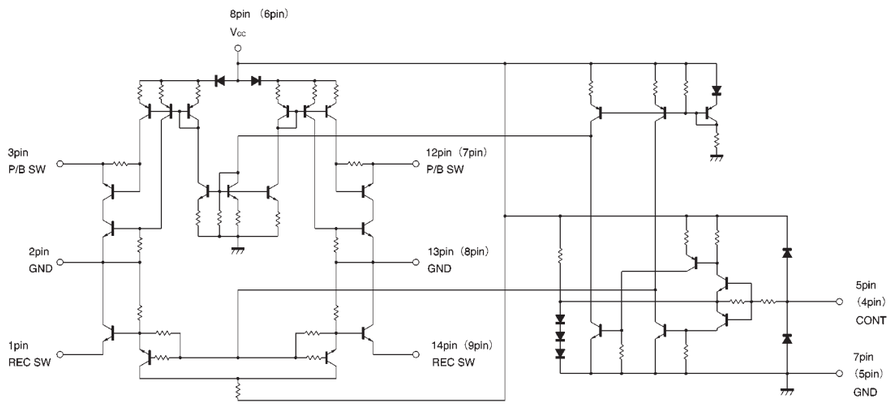
TAPE HEAD SWITCHING IC
BA3126N

Block diagram



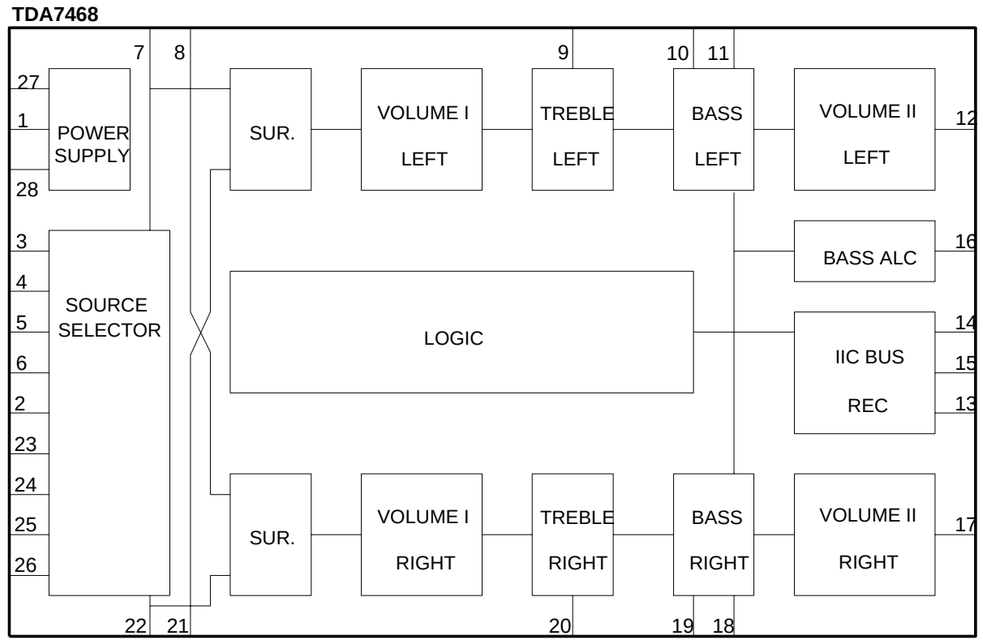
Internal circuit configuration



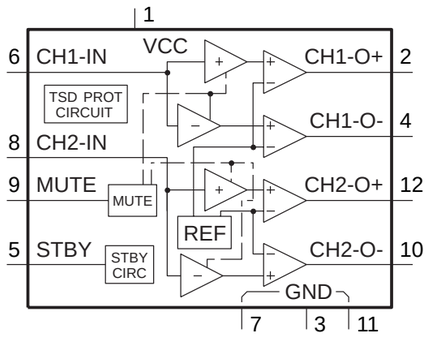
Pin numbers for the BA3126F (BA3126N pin numbers are in brackets).

IC BLOCK DIAGRAM
TDA7468

TDA7468 INTERNAL BLOCK DIAGRAM

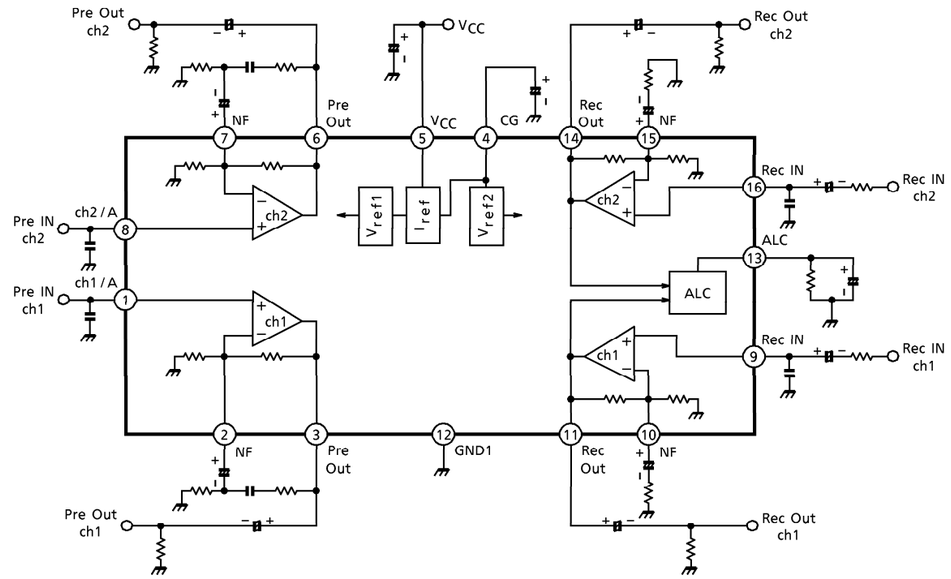


IC BLOCK DIAGRAM
AN17830A



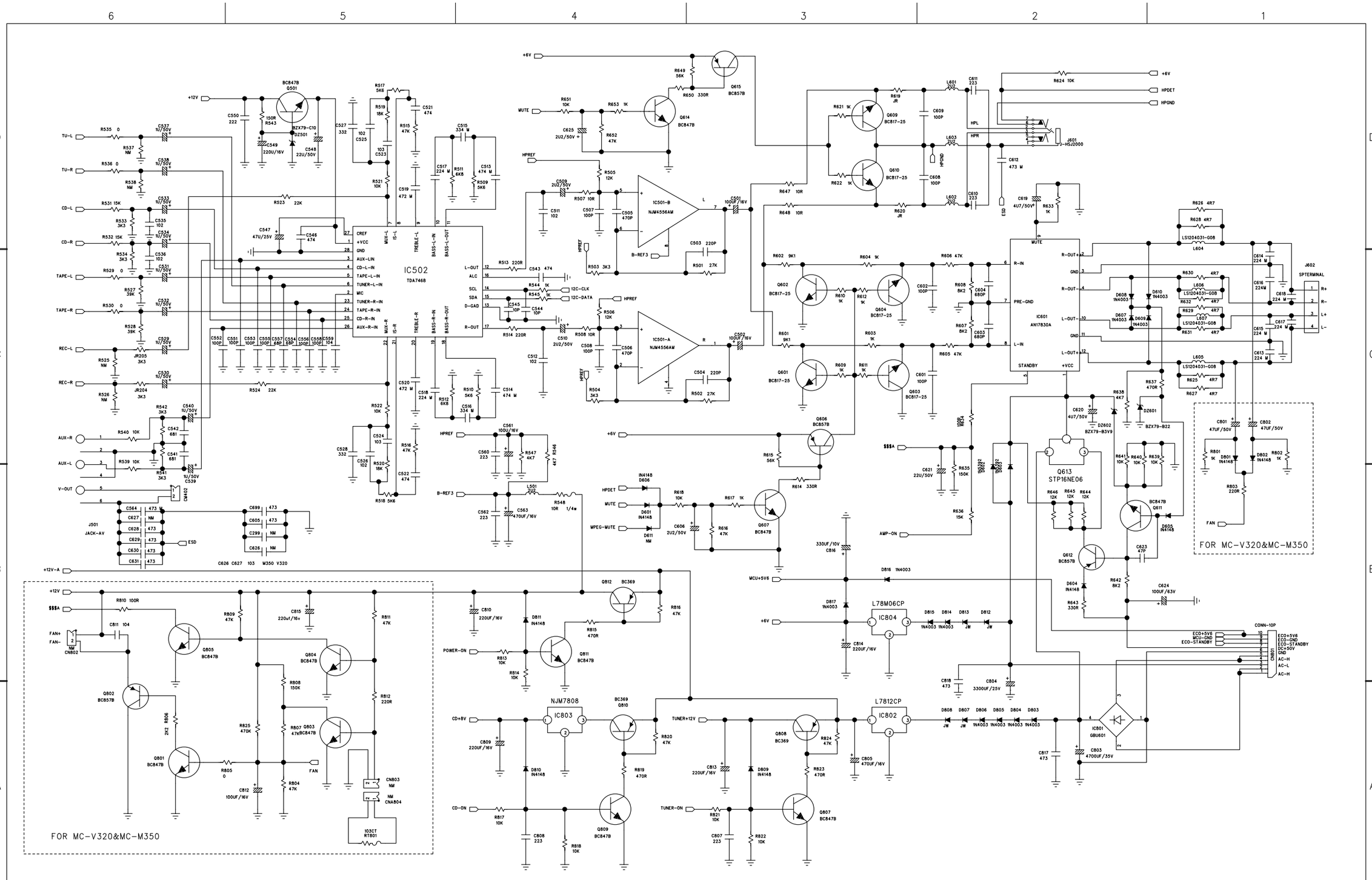
10-3

IC BLOCK DIAGRAM
TA8142AP



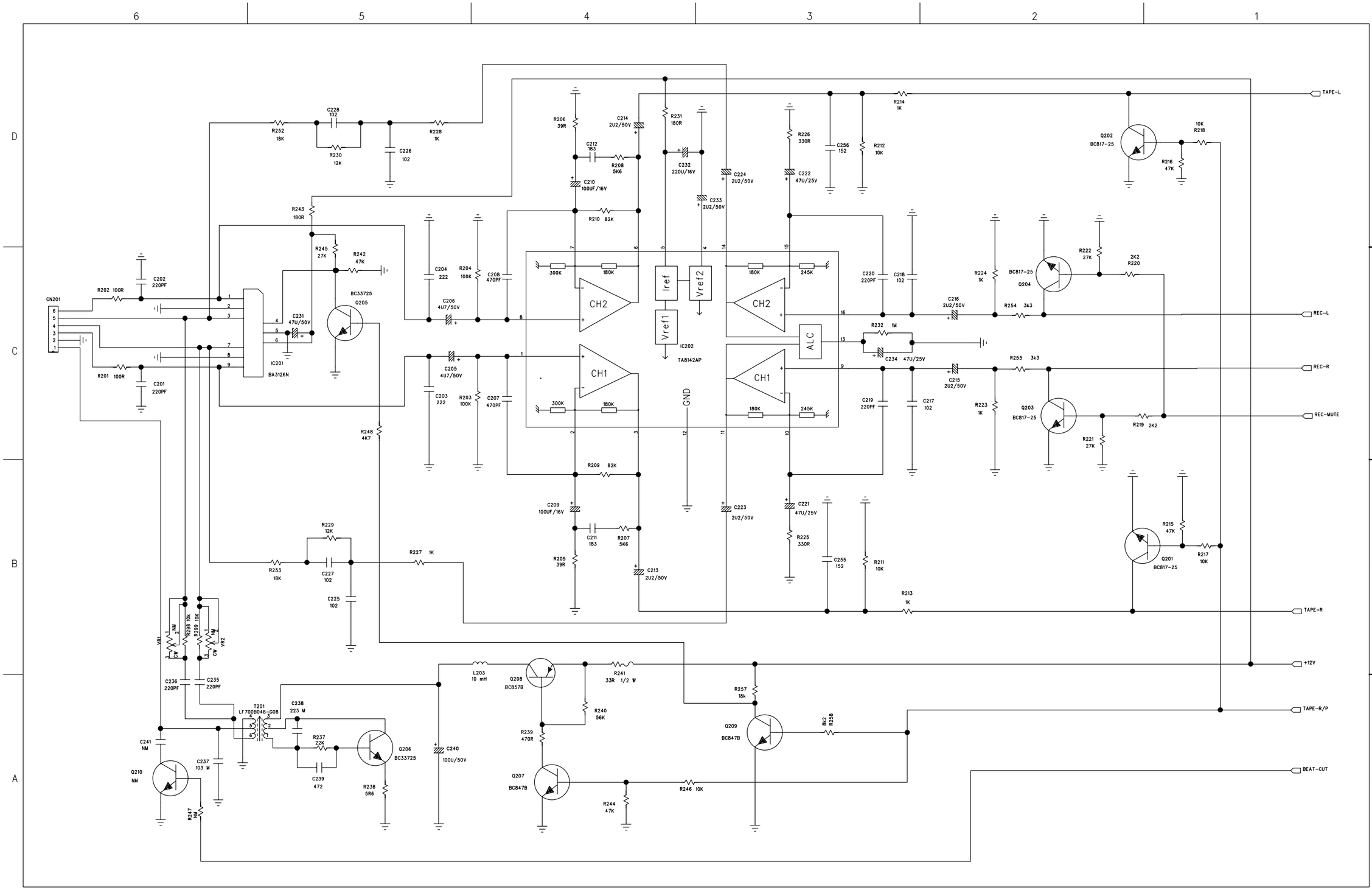
10-4

MAIN BOARD - CIRCUIT DIAGRAM



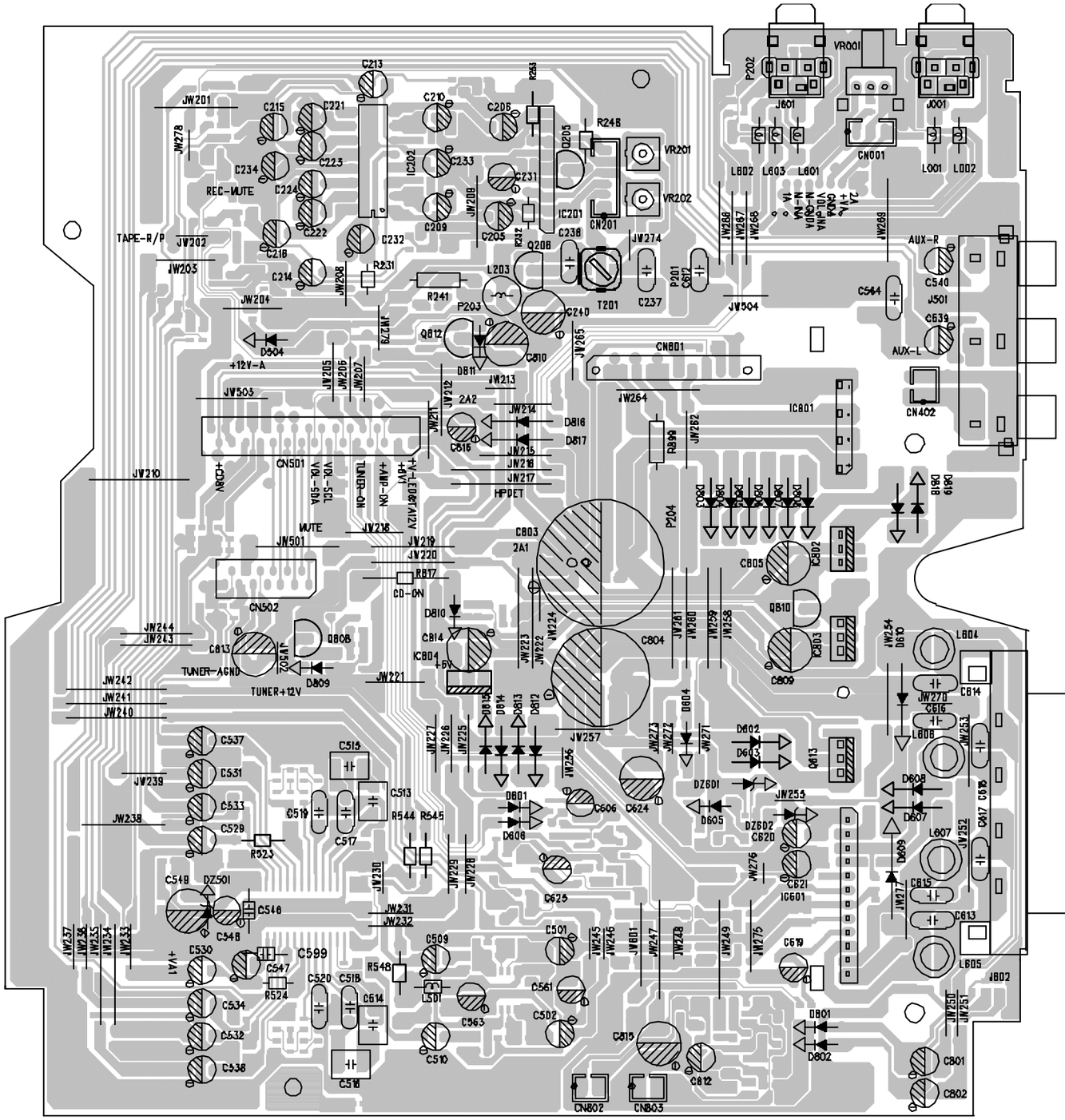
10-5

TAPE PART - CIRCUIT DIAGRAM



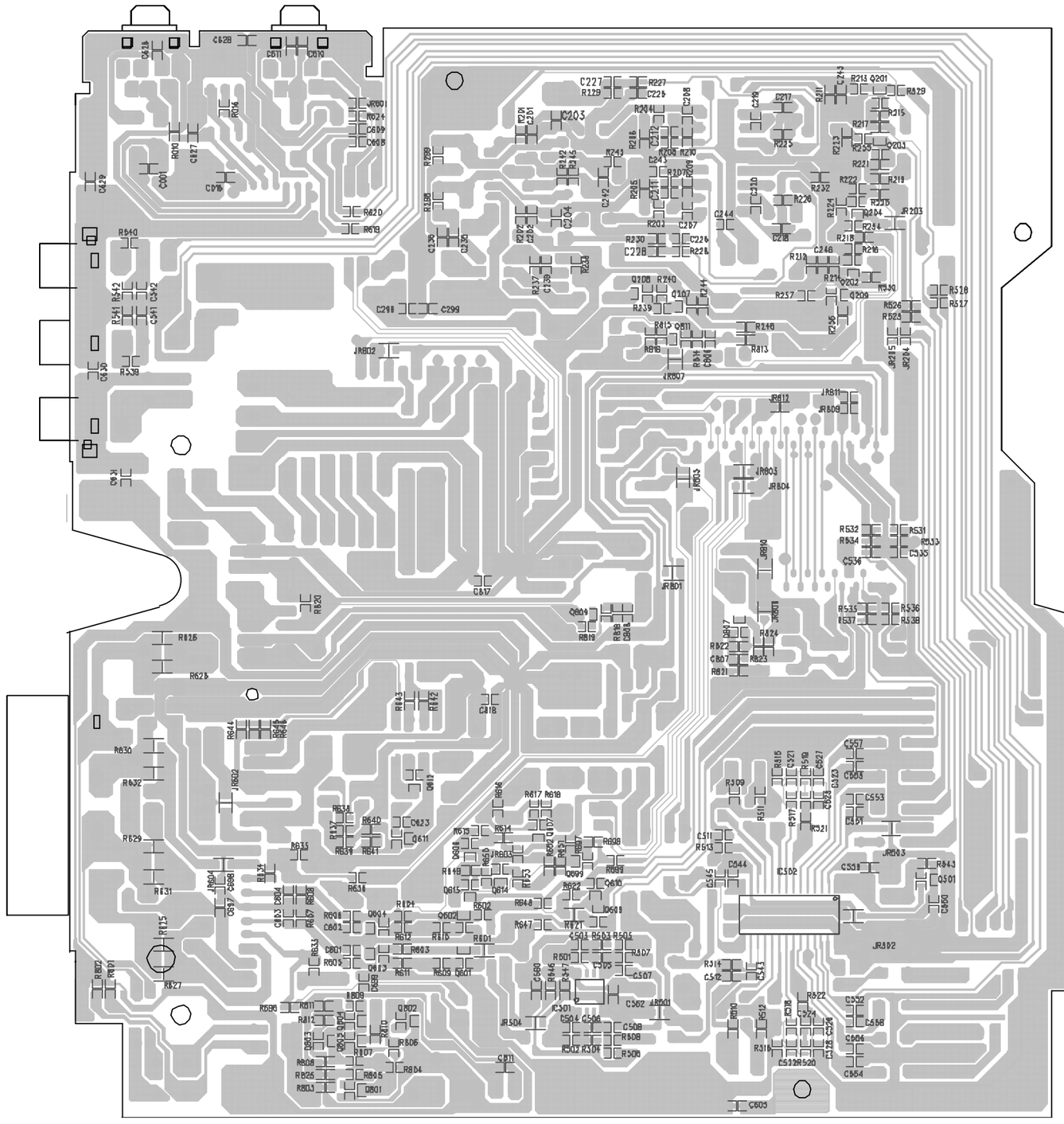
10-6

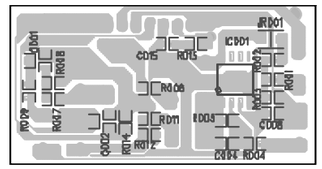
MAIN PCB - COMPONENT LAYOUT



10-7

MAIN PCB - SMD LAYOUT





10-8

ELECTRICAL PARTSLIST - MAIN BOARD

- MISCELLANEOUS -

CN201	9965 000 14509	CON BASE 6P
CN403	9965 000 18229	CONN P=1.5 H 6PIN
CN404	9965 000 18230	CONN 16P H P=1.0
CN405	9965 000 18231	CONN 22P P=1.0 H
CN501	9965 000 18232	CONN 30P P=1.25 V
CN502	9965 000 18233	CONN 13P P=1.25 V
CN801	9965 000 18234	WIRE ASS' Y 10P L170MM
CN802	9965 000 19716	CONNECTOR BASE 2P
CN803	9965 000 19717	WIRE ASS' Y 2PIN L=250MM
CN806	9965 000 19718	CONNECTOR 2P PH-2A
J 501	9965 000 18238	J ACK-AV 2 MC-320
J 601	9965 000 19719	HEAD PHONE J ACK D3.5MM
J 602	9965 000 18239	SPK TERMINAL 4P 94V0
ZA1	9965 000 14709	TERMINAL PIN

- RESISTORS -

R241	⚠	9965 000 18241	FUSE RESISTOR 33Ω 1/2W
R548	⚠	9965 000 18242	FUSE RES NFR 25 A 10Ω
RT801	⚠	9965 000 19722	NTC RES 10KΩ

- COILS & FILTERS -

L203	9965 000 18240	FIXED IND 10MH
L501	9965 000 19720	FIXED IND 2.2μH K CECS
L601	9965 000 19720	FIXED IND 2.2μH K CECS
L602	9965 000 19720	FIXED IND 2.2μH K CECS
L603	9965 000 19720	FIXED IND 2.2μH K CECS
L604	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
L605	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
L606	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
L607	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
T201	9965 000 18243	OSC 85KHZ COIL

- DIODES -

D601	4822 130 30621	1N4148
D602	4822 130 31878	1N4003G
D603	4822 130 31878	1N4003G
D604	4822 130 30621	1N4148
D605	4822 130 30621	1N4148
D606	4822 130 30621	1N4148
D607	4822 130 31878	1N4003G
D608	4822 130 31878	1N4003G
D609	4822 130 31878	1N4003G
D610	4822 130 31878	1N4003G
D801	4822 130 30621	1N4148
D802	4822 130 30621	1N4148
D809	4822 130 30621	1N4148
D810	4822 130 30621	1N4148
D811	4822 130 30621	1N4148

- DIODES -

D814	4822 130 31878	1N4003G
D815	4822 130 31878	1N4003G
D816	4822 130 31878	1N4003G
D817	4822 130 31878	1N4003G
DZ501	4822 130 61219	BZX79-B10
DZ601	4822 130 34441	BZX79-B22
DZ602	4822 130 31981	BZX79-B3V9

- IC & TRANSISTORS -

IC201	4822 209 30188	BA3126N
IC202	4822 209 32082	TA8142AP
IC501	5322 209 15853	NJM4556AM
IC502	9322 150 74668	IC SM TDA7468D (ST00) R
IC601	9322 174 32682	IC AN17830A (MATJ) B
IC801	9965 000 18236	IC GBU601
IC802	4822 209 81726	MC7812CT
IC803	4822 209 33083	L7808CV
IC804	4822 209 61533	NJM7806A
Q201	4822 130 42804	BC817-25
Q202	4822 130 42804	BC817-25
Q203	4822 130 42804	BC817-25
Q204	4822 130 42804	BC817-25
Q205	4822 130 40981	BC337-25
Q206	4822 130 40981	BC337-25
Q207	5322 130 60159	BC846B
Q208	4822 130 60373	BC856B
Q209	5322 130 60159	BC846B
Q501	5322 130 60159	BC846B
Q601	4822 130 42804	BC817-25
Q602	4822 130 42804	BC817-25
Q603	4822 130 42804	BC817-25
Q604	4822 130 42804	BC817-25
Q606	4822 130 60373	BC856B
Q607	5322 130 60159	BC846B
Q609	4822 130 42804	BC817-25
Q610	4822 130 42804	BC817-25
Q611	5322 130 60159	BC846B
Q612	4822 130 60373	BC856B
Q613	4822 130 11336	STP16NE06FP
Q614	5322 130 60159	BC846B
Q615	4822 130 60373	BC856B
Q699	5322 130 60159	BC846B
Q801	5322 130 60159	BC846B
Q802	4822 130 60373	BC856B
Q803	5322 130 60159	BC846B
Q804	5322 130 60159	BC846B
Q805	5322 130 60159	BC846B
Q807	5322 130 60159	BC846B
Q808	5322 130 44593	BC369

ELECTRICAL PARTSLIST - MAIN BOARD

- IC & TRANSISTORS -

Q809	5322 130 60159	BC846B
Q810	5322 130 44593	BC369
Q811	5322 130 60159	BC846B
Q812	5322 130 44593	BC369

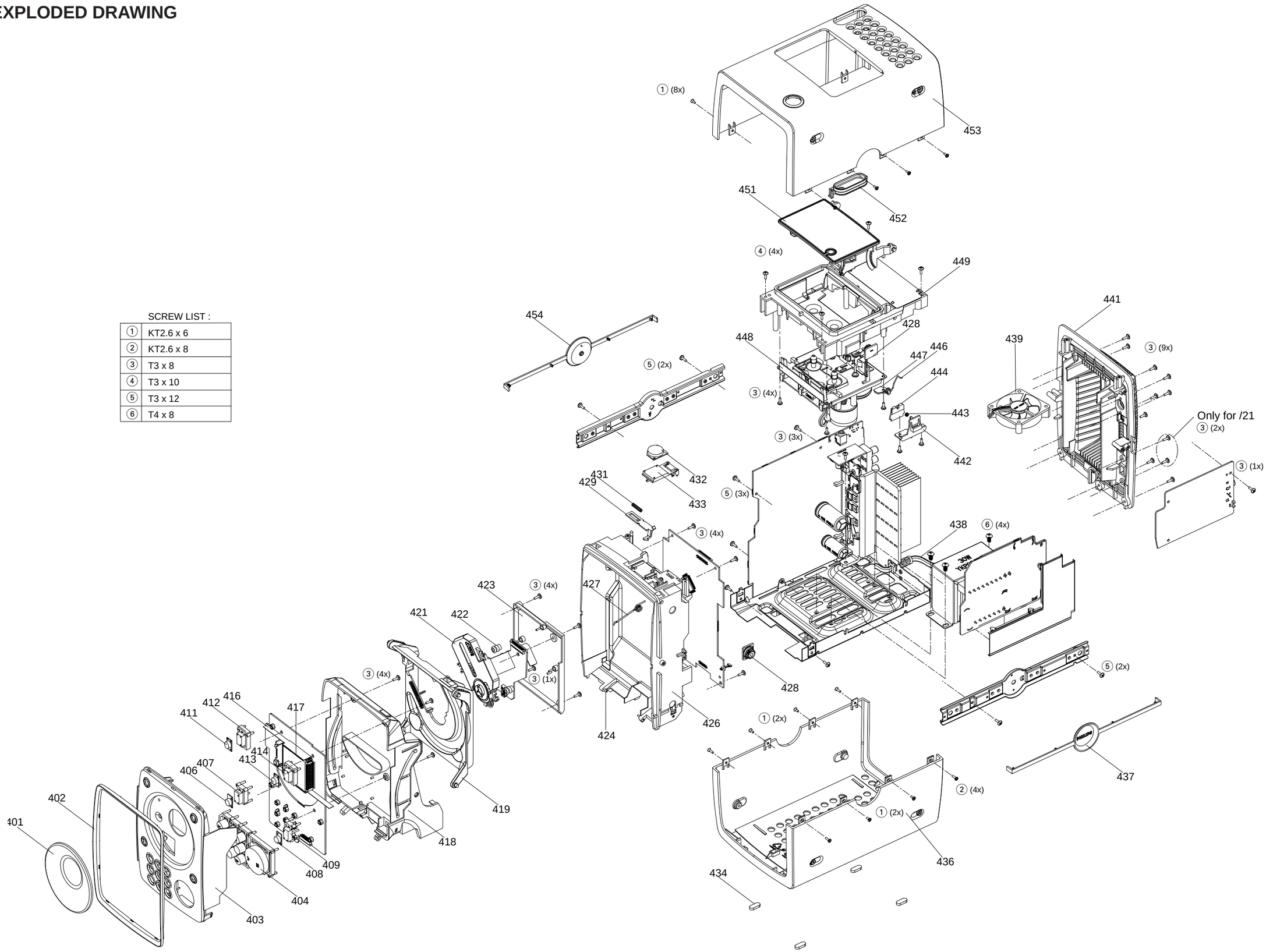
Note: Only these parts mentioned in the list are normal service parts.

11-1

EXPLODED DRAWING

SCREW LIST :

①	KT2.6 x 6
②	KT2.6 x 8
③	T3 x 8
④	T3 x 10
⑤	T3 x 12
⑥	T4 x 8



11-2

MECHANICAL & ACCESSORIES PARTSLIST

401	9965 000 19710	CD DOOR LENS /21
401	9965 000 19752	CD DOOR LENS /22/25
402	9965 000 18185	CD CHROME RING
402	9965 000 19702	CD DOOR PANAL /21
403	9965 000 19751	CD DOOR PANEL /22/25
404	9965 000 19703	KEY SET FUNCTION
406	9965 000 18194	KEY DISPLAY CAP
407	9965 000 18203	KEY DISPLAY BRACKET
408	9965 000 18196	KEY REC CAP
409	9965 000 18205	KEY REC BRACKET
411	9965 000 19704	KEY POWER CAP
412	9965 000 18202	KEY POWER BRACKET
413	9965 000 19705	KEY IR CAP
414	9965 000 18204	KEY IR BRACKET
416	9965 000 18255	REFLECT LIGHT GUIDE
417	9965 000 18256	LCD LIGHT GUIDE
418	9965 000 18177	CD DOOR
419	9965 000 18188	CD TRAY
421	9965 000 18220	CD DECK DA23Z
422	9965 000 18212	DMPR MECHA (SP)
423	9965 000 18189	CD TRAY COVER
424	9965 000 18213	CD DOOR SHAFT
426	9965 000 18180	CD BRACKET
427	9965 000 18216	CD TRAY SPRING
428	4822 529 10322	DAMPER ASSY
429	9965 000 18198	CD DOOR LEVER
431	9965 000 18214	CD DOOR LEVER SPRING
432	9965 000 19706	CD DOOR KNOB CAP
433	9965 000 18206	CD DOOR KNOB BRACKET
434	9965 000 18208	FOOT RUBBER
436	9965 000 19622	CAB BOTTOM
437	9965 000 19708	BRAND RIM RIGHT
438	⚠ 9965 000 18223	AC CORD E 1750MM /21/22
438	⚠ 9965 000 18319	AC CORD 1750MM /25
439	9965 000 19713	DC FAN
441	9965 000 19699	CAB REAR /21
441	9965 000 19750	CAB REAR /22/25
442	9965 000 18181	BRACKET-LEFT
443	9965 000 18211	SPRING-C LOCK
444	9965 000 18192	PUSH CATCH LEFT
446	9965 000 18215	CASS DOOR SPRING
447	9965 000 18207	CASS SPRING BKT
448	9965 000 18221	CASS DECK CRM4304
449	9965 000 19701	CASS BKT
451	9965 000 19700	CASS DOOR
452	9965 000 19709	DECORATION TOP
453	9965 000 19698	CAB TOP
454	9965 000 19707	BRAND RIM LEFT
	4822 303 50082	AM LOOP ANTENNA
	9965 000 11157	FM ANTENNA WIRE
	9965 000 19712	IFU MC-M350/21
	9965 000 19755	IFU MC-M350/22/25
	9965 000 19714	SPK BOX MC-350 30W
	9965 000 19715	REMOTE CONTROL MC-M350
	9965 000 18224	FFC 9P L=250MM P=1.25
	9965 000 18225	FFC 13P L=200MM P=1.25
	9965 000 18226	FFC P=1.0 L=115MM
	9965 000 18227	FFC 22P L=90MM P=1.0
	9965 000 18228	FFC 30P L=150MM P=1.25
	⚠ 9965 000 18217	AC CONVERSION /21

Note: Only these parts mentioned in the list are normal normal service parts.